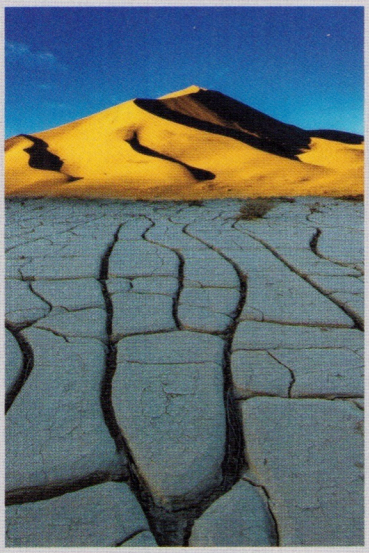
EUREKA VALLEY DUNES

Honorable Ment



Nic Stover

4-year member | San Luis Obispo
Flowing Time | Nikon D850

"The **Eureka Dunes** in Death Valley National Park are California's highest sand dunes, reaching more than 500 feet into the sky. During my first visit to the dunes (and my fourth visit to Death Valley) on a cold February [2021] morning, I found my spot on the mud-cracked playa and waited for the light to illuminate the sand dune and provide the flow of time I sought."

Yellow

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Eureka Valley Dunes

Bureau of Land Management

EUREKA VALLEY DUNES

The vastness of the California Desert contains many areas endowed by nature, or man, with characteristics that set them apart. Eureka Dunes is one of these. In fact, Eureka Dunes is so unique that the Secretary of the Interior designated the dunes as a National Natural Landmark in early 1983. The Bureau of Land Management and the California Department of Fish and Game have developed a management plan to protect the areas unique habitat.

From a distance, the Eureka Dunes appear to float above the floor of the Eureka Valley. This image results because the light colored dunes stand out in sharp contrast to the surrounding mountains which are composed of very dark colored rocks. The highest point of the dunes stands 682 feet above the valley floor, making them the tallest in California.

The Eureka Dunes are about 40 miles south and east of Bishop but actually are about 56 miles by available roads. They are about 25 miles east of Big Pine, with access by unimproved dirt roads only.

The dune system is best described as "transverse dunes with a sand mountain." The total area of the designated Area of Critical Environmental Concern (ACEC), which includes the dunes, is eight square miles. The northern boundary is a main dirt road which crosses the north end of the dunes and continues into the Saline Valley corridor.

LOCATION

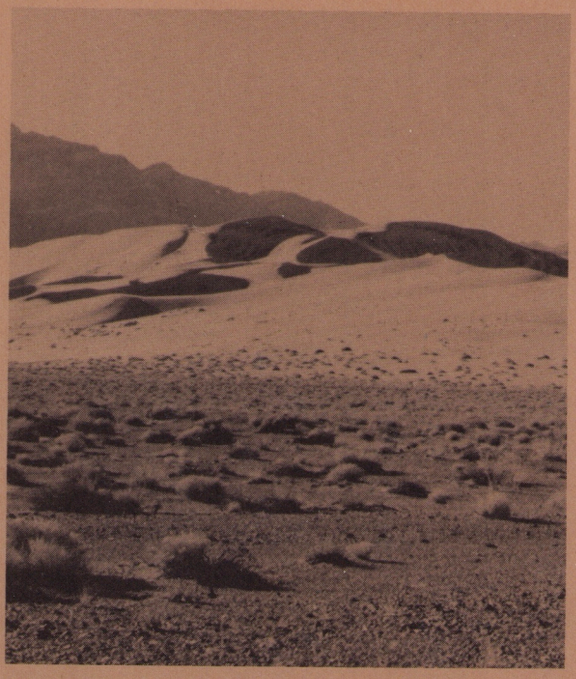
The dunes are in the northern part of the California Desert Conservation Area. They are accessible by driving 45 miles east from Big Pine or 50 miles north from Death Valley on paved or graded dirt roads.

RECREATION OPPORTUNITIES

The entire sand dune area was closed to all vehicle use in 1977. Other types of non-vehicular use are allowed and popular activities in the dunes include overnight camping, hiking and photography. For those wanting to drive off-highway vehicles on sand, the Olancha Dunes in southern Owens Valley and the Dumont Dunes south of Death Valley are open for such vehicular use.

SCENIC VALUES

The dominant form of the area is the majestic towering dune mass. Overlooking the dunes from a greater height to the east is the darker, imposing shape of the Last Chance Range. The dominating expression of color in the area is the soil and rocks. The contrast from the dull brown



valley, to the bright whitish-gray of the dunes, to the dark grey-black of the mountain ranges, to the luminous blue sky, expresses color as an important element of the landscape character.

A scene almost as striking as the dunes themselves is the prominent multicolored strata exposed on the face of the Last Chance Mountains. The form and rich colors of these strata create a background for the paler dune system, which, when viewed at dawn or sunset, create a panorama of sand and rock of exquisite beauty. With sufficient rainfall, an astonishing variety of color and beauty is displayed in a carpet of wild flowers in the Spring.

WILDERNESS

The Eureka Dunes ACEC is contained within Saline Valley Wilderness Study Area and has been designated as suitable for inclusion in the National Wilderness System.

Until Congressional review is completed, the area must be managed under the Bureau of Land Management's interim management policy and guidelines for land under wilderness review to ensure that wilderness characteristics and values are not impaired.

The dunes are the most unique and outstanding feature within Eureka Valley. Three factors are needed to build a dune formation: the presence of a source of sand; a recurrent wind strong enough to move the sand; and a place where the sand can accumulate. Weathered outcroppings of sandstone and alluvial fans provide the sand. Winds of necessary velocity are common, particularly in the spring. The configuration of the surrounding mountains causes the winds to eddy and deposit the suspended sands in the southern end of the valley. North of the dunes, the valley narrows and then opens into a large circular basin at the southern end. North and northwest winds, funneling through the constricted part of the valley, swirl around the southern basin, and, slowed down, lose their ability to transport the sand which settles down into the dune system.

The exact age of the Eureka Dunes is unknown. In geologic terms they are considered recent, however, they are at least several thousand years old.

Rising 900 feet above the valley floor, these dunes are the tallest in all of California and the Great Basin. The Eureka Dunes are a unique natural resource that need to be preserved for the enjoyment of future generations.

CULTURAL RESOURCES

Archaeological sites are not uncommon near the Eureka Dunes. Because these sites are considered sensitive, they are not described in this brochure. The visitor to Eureka Dunes is reminded that unauthorized collection of artifacts and disruption of archaeological sites is a violation of federal law under the Antiquities Act.

Endangered Plants of the Eureka Valley Sand Dunes

What is an endangered plant species?

An endangered plant species is any plant which is in danger of extinction throughout all or a significant portion of its range.

How is it determined that plants are endangered or threatened species?

There are several considerations:

1. The present or threatened destruction, change, or reduction of the plant's habitat (home) or range.
2. Disease or predation (such as overgrazing by animals).
3. Not enough means to regulate the adverse effects on the plants.
4. Other natural or man-made factors affecting the plant's continued existence.

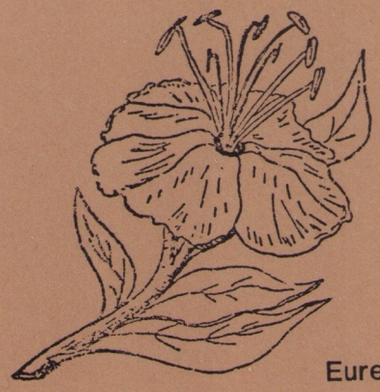
VEGETATION, FLORA, AND ENDANGERED PLANT SPECIES

The three major vegetation types predominant within the Eureka Dunes area are: Creosote bush scrub; allscale alkali scrub, which occurs along the edge of the playa due west of the dunes; and the psammophytic (or "sand plant") scrub steppe, which occurs on the dunes proper.

The primary species within the creosote bush scrub plant assemblage are creosote bush, bur sage, indigo bush and shadscale. Some of the species extend onto the low dunes so that there are no clearly defined boundaries between any of the vegetation types.

The playa periphery supports a plant assemblage of halophytes (salt tolerant plants) including allscale, shadscale, red molly, and alkali blite.

The Eureka Dunes themselves support a psammophytic plant assemblage. The word psammophytic refers to plants which inhabit sandy areas. The predominant species is Eureka dune grass, a perennial dune binding grass. This species, the only living member of its genus (**Swallenia**), is a federally listed endangered species and is endemic to Eureka Valley. It occurs throughout the dunes and is one of only two species present on the highest part of the dunes (the other being desert dicoria). Other species present on the lower and more stable portions of the dunes include: Eureka Dunes evening primrose, which is also federally listed as endangered; shining locoweed, which is under review for possible listing; plicate clodenia; Indian rice grass; and another indigo bush.



Eureka Dunes
Evening Primrose

WILDLIFE

The Eureka Dunes support a relatively rich fauna. Vertebrates are well represented. Thirty species of birds are known to inhabit the dunes and the areas immediately adjacent to them. Six additional species, mostly water birds, are known to utilize the area during periods of standing water.

Fairy shrimp and shield are common in the playa after summer thunderstorms when water is present. These are evanescent creatures whose immediate concern is to mate and lay eggs which become encysted until water is again present.

At least nine species of reptiles occupy the Eureka Dunes. Other than bats, 15 species of mammals have been recorded, 10 of which are rodents. The most important is the pallid kangaroo mouse which reaches the southern limit of its range in this region. Carnivores include the coyote and bobcat. Although desert bighorn sheep are usually confined to the Last Chance Range, individual animals are known to approach the dunes during their rare migrations. As many as 16 species of bats occur; 11 of them fly in from nearby valleys, such as Owens, Saline, and Deep Springs.

GEOLOGY

Eureka Valley is a down-faulted desert basin surrounded by uplifted mountains: the Last Chance Mountains to the east, the Saline Mountains to the south, and the Inyo Mountains to the west and north. These rugged, sparsely vegetated and multicolored ranges stand out starkly from the sediment filled valley. Eureka Valley is a closed basin which, in earlier geologic times, was a large and deep freshwater lake. In the more arid climate of today, Eureka Valley contains a shallow ephemeral lake or playa more than two and one-half miles long by a mile wide.

Route 18 Big Pine to Furnace Creek

This long, little-traveled, adventurous route is the northwest passage into Death Valley National Park, crossing two mountain ranges and linking two great North American deserts. Within the Park it brings you to the colorful geology of Ubehebe Crater and the equally colorful history of Scotty's Castle.

What to expect: The partially paved road from Big Pine to Crankshaft Junction can be snowy in winter or washed out any time; the Big Pine Chamber of Commerce can usually tell you if it's passable. Also call the Park for condition of roads within its boundaries. Fill your tank and check your spare at Big Pine—no services are available until Scotty's Castle. Intersections are well-marked. A Park entrance station collects a small fee. The route ends in Death Valley, so plan an overnight stay.

Length: 105 miles one way.

Driving time: 4 hours one way.

Getting there: The route starts at Big Pine and goes east on Hwy.168 from its intersection with Highway 395 at the north end of town.

Scotty's Castle
©JOY FATOOH

Along the route: Just after crossing the Owens River a plaque on the left marks the site of Zurich, a railroad station on the Carson & Colorado line. Traces of buildings can still be seen. A bit farther is the right turn onto paved, but rough, Death Valley Road. Check the sign for road closures.

The mountains ahead are called the Inyos from here south, and the Whites to the north. As you climb, look back for an overview of the forces that shaped Owens Valley—the steeply fault-tilted, glaciated Sierra, and basalt cinder cones on the valley floor—just before the road enters the Inyos. Unlike the granite Sierra, the result of magma cooled underground, the White/Inyo range is mostly ancient lakebeds, with fossil-rich layers of rock such as limestone and dolomite. About five miles farther the road passes through a narrow canyon where the layers have been wildly contorted by earthquake faults.

At about sixteen miles you'll top the crest; use a low gear and save your brakes going down. Soon you leave the sagebrush-dominated Great Basin Desert and enter the Mojave Desert, where rangy creosote bushes and bizarrely-shaped Joshua trees prevail. At thirty miles the road descends into the north end of Eureka Valley. At the south end, visible from here, are the Eureka Dunes—second-tallest sand dunes in the United States. Pavement ends and there are about seven miles of dirt road eastward across the valley.

Just after pavement resumes is the turnoff to the dunes: 10 miles of rough dirt road, a long, bumpy optional side trip. If you do go be aware that this isolated island of sand, with its challenging conditions for life, has led to the evolution of plant and insect species found nowhere else. Here, as always, stay on established roads!

Our route continues on pavement and climbs up Hanging Rock Canyon into the Last Chance Range. After five miles pavement ends again after passing a private sulfur mine (entry is illegal). The road descends into Death Valley and veers south at Crankshaft Junction, marked by several rusted old crankshafts. After twenty miles is a right turn onto the three-mile paved road to Ubehebe Crater. This giant red and orange hole in the flank of Tin Mountain was formed by a huge steam explosion when magma rose to encounter groundwater. You can hike around its rim, or scramble to the bottom and laboriously climb back out.

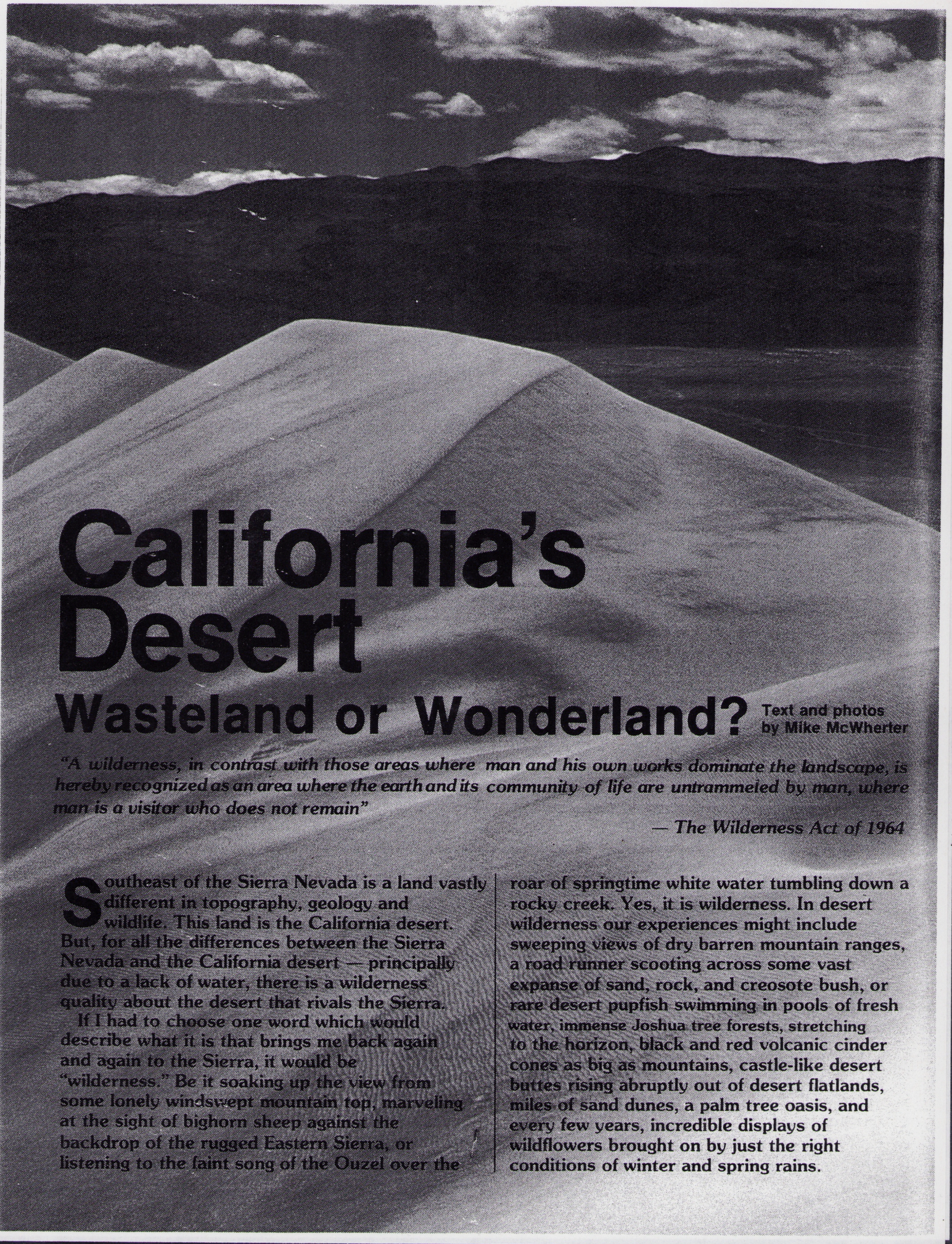
Return to the main road, now paved, and continue southeast three miles to the left turn to Scotty's Castle. Death Valley Scotty fooled Easterners into investing in an imaginary gold mine, including a millionaire Chicago couple who eventually befriended Scotty and let

him continue the ruse that their vacation home was built with income from his secret mine. Tickets for tours are sold on the grounds. If you love old junk, pick up a Tie Canyon trail guide at the ticket booth and hike through the historic storage yard.

Back on the main road, proceed through the Park entrance station. (Fee required.) After 18 miles you may choose a quick side trip to Titus Canyon, with walls hundreds of feet high only 20 feet apart. Continuing along the main road brings views of colorfully striped mountains and vast sand dunes. At the T intersection with Highway 190 turn left toward Furnace Creek. Within 7 miles is a short spur road to the home of the Salt Creek pupfish, one of the amazing local species that have adapted to an incredible array of harsh desert conditions. Furnace Creek, which has a visitor center, food, lodging and camping, is the end of the route.

Ubehebe Crater
©JOY FATOOH

Joshua trees
©JOY FATOOH



California's Desert

Wasteland or Wonderland?

Text and photos by Mike McWherter

"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man is a visitor who does not remain"

— The Wilderness Act of 1964

Southeast of the Sierra Nevada is a land vastly different in topography, geology and wildlife. This land is the California desert. But, for all the differences between the Sierra Nevada and the California desert — principally due to a lack of water, there is a wilderness quality about the desert that rivals the Sierra.

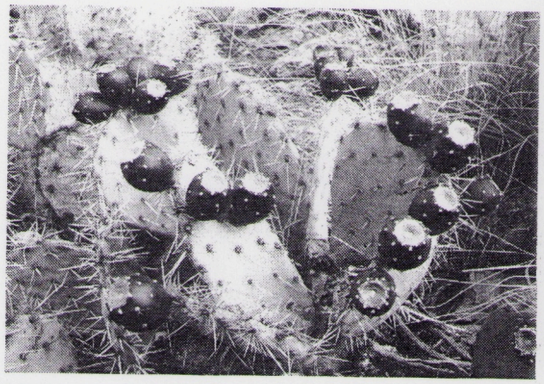
If I had to choose one word which would describe what it is that brings me back again and again to the Sierra, it would be "wilderness." Be it soaking up the view from some lonely windswept mountain top, marveling at the sight of bighorn sheep against the backdrop of the rugged Eastern Sierra, or listening to the faint song of the Ouzel over the roar of springtime white water tumbling down a rocky creek. Yes, it is wilderness. In desert wilderness our experiences might include sweeping views of dry barren mountain ranges, a road runner scooting across some vast expanse of sand, rock, and creosote bush, or rare desert pupfish swimming in pools of fresh water, immense Joshua tree forests, stretching to the horizon, black and red volcanic cinder cones as big as mountains, castle-like desert buttes rising abruptly out of desert flatlands, miles of sand dunes, a palm tree oasis, and every few years, incredible displays of wildflowers brought on by just the right conditions of winter and spring rains.

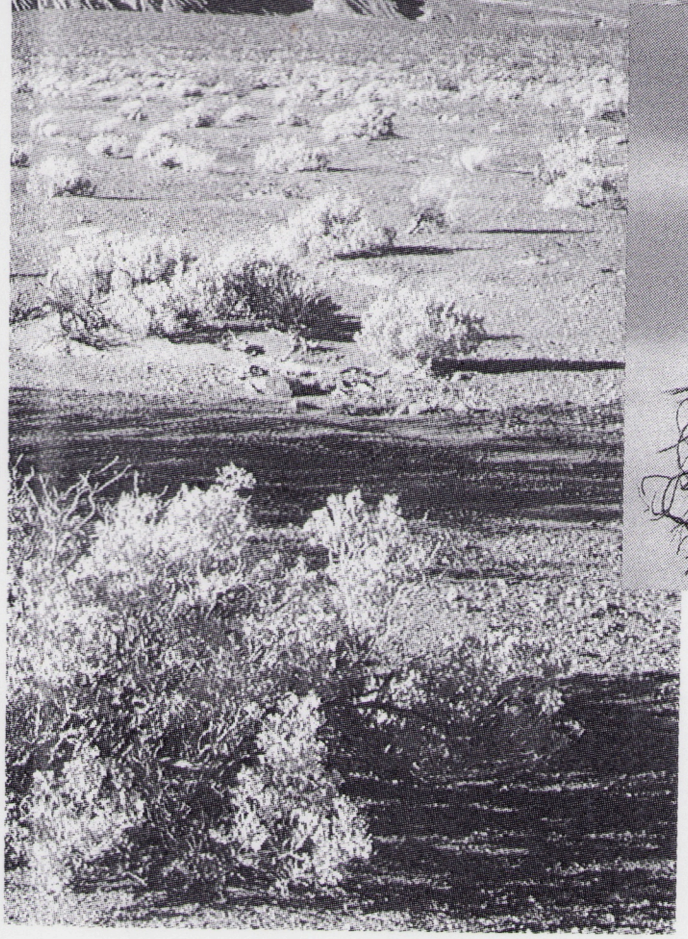
Unlike the California desert, the Sierra Nevada has many areas which are part of our treasured National Wilderness Preservation System. In this system wilderness lands are protected by law for their wilderness qualities. Some of these lands are as familiar to us as old friends: John Muir Wilderness, Emigrant Wilderness, Hoover Wilderness, Minarets Wilderness, and Domeland Wilderness. None of California's precious desert wildlands are part of our National Wilderness System. These wildlands, except in existing National Monuments and State Parks, are vulnerable to uses which may forever destroy their wilderness qualities.

Over the years conservationists have been working hard to convince the public and Congress that certain areas of the California desert are special and are worth preserving as wilderness. California's Senator Alan Cranston has introduced a bill into Congress, The California Protection Act (S. 7), that will do just that. The bill is the culmination of years of effort by many people and organizations who believe that the wilderness qualities of the California desert are worth preserving not only for our enjoyment, but for future generations to enjoy also.

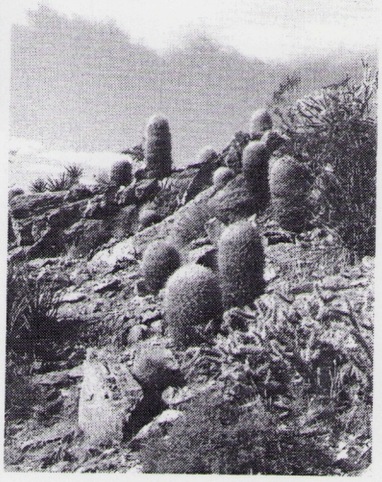
Eureka Dunes and the Wilderness Experience

Many years ago, on a fall trip with my ten-year-old son to the Sierra's Palisades above Big Pine, California, the weather did not cooperate. Heavy rains were pounding the back country. Looking for a way to save the trip, we noticed in the east a clear blue sky over the Inyo Mountains and the desert lands beyond. We hightailed it back to Big Pine and headed east on the road to Eureka Valley. A few miles outside of town, we found our turnoff





Far Left: Saline Valley, located in Inyo County, provides visitors with sparkling air and breath-taking desert vistas.
Left: The California desert is rich in bird life.
Above: Prickly Pear Cactus ripe with fruit.
Below: Barrel cactus. Part of the unique flora of the proposed Mojave National Park.



and a sign which read "Next Services 72 Miles." The road climbed to the west side of the Inyos and when we looked back we could see the peaks of the Palisades shrouded in heavy dark clouds. We continued our journey down the east side of the Inyos and into the heart of Eureka Valley, a vast desert valley surrounded by parched, rugged desert ranges. Near the bottom of the valley, the pavement turned to dirt. In the far distance Eureka Dunes appeared as a strange white mass shimmering in the warmth of the mid-day sun. Distances are deceptive in the clear desert air and it was difficult to judge the height of the dunes. With each passing minute the dunes seemed to grow in height. After about 30 minutes of teeth rattling along the rough washboard dirt road, we found ourselves at the base of the dunes and looking up to their summit — over 500 feet above us — and wondering: where did all this sand come from?

We decided to climb to the top of the dunes for the view and to get a feeling of their size. Shoes were soon discarded because of the the grating sand. The surface of the sand felt warm on my feet but only a few inches down it was cool. Recent rain showers had compacted the sand, making walking on it easy. We followed a ridge which wound upwards. After some effort we looked back to the car. It resembled a little toy parked at the base of some huge sandpile. To the north stretched Eureka Valley Surrounded by dry and barren mountains colored in soft pastel shades of brown. To the east the Last Chance Range separated Eureka Valley and Death Valley. I wondered why Death Valley National Monument did not include Eureka Dunes for they are as sublime as any of the other natural wonders of Death Valley. To the west

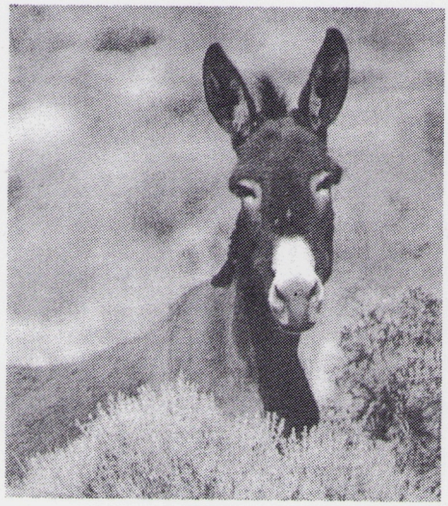
rose the Inyos, tallest of California's desert mountain ranges, spreading north to culminate in 14,000-foot White Mountain. To the south, the Saline Range appeared dark and mysterious.

From the top of the dune we saw a land where the clarity of the atmosphere produces those daytime "see-forever" views and a night sky so transparent that the Milky Way seems to touch the earth. And the wonderful supreme silence, occasionally broken by the rattling of wind-born sand particles bouncing up and over the dune and a crackling sound caused by sand particles striking some dry dune grass — nature's music in an otherwise silent world. At the top of the dune the ridge dropped away, curving gently as it lost elevation in its journey southward. I took a deep breath of fresh air. Senses were alert from the exertion of the climb. Everywhere there was an ambience of peace.

I thought how important it is to me to be able to come to places like Eureka Dunes where one can find this wilderness quality. I wonder if in the future others will be able to come here and find the same peace. Whether or not such an opportunity to experience this feeling will even exist for them will depend upon what we do today to assure that Eureka Dunes and other special wildlands in the California desert retain their wilderness qualities.

And what about future generations? Is this kind of wilderness experience worth saving for them? Will they even value such things? Wilderness advocate and writer Wallace Stegner wrote "Something will have gone out of us as people if we ever let the remaining wilderness be destroyed . . . if we pollute the last clean air and dirty the last clean streams and push our paved roads through the last of the silence."

I believe that there must be places where we can go where nature's works dominate. We need places where we can experience a reunion with nature, where nature's energy can revitalize spirits tired from the sight of concrete and asphalt, the sound of engine noise, the smell of combustion. There is something almost religious about experiencing wilderness. Perhaps it is nature in the purest form we can find it, as yet undisturbed by man. John Muir was undoubtedly describing this feeling about wilderness when he wrote: "Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop like autumn leaves." Although he was probably writing about the wilderness experience in places like the Sierra Nevada, his words apply equally well to our desert wildlands.



Death Valley National Park
Eureka Dunes

Eureka Dunes are the tallest in California.

A pale mountain of sand appears to hover over the flat valley floor. Rugged cliffs loom high above, boldly striped with pink, gray, and black. The distant yipping of a coyote is interrupted by a mysterious rumbling sound emitting from the dune itself. Welcome to Eureka Dunes, one of the newest additions to Death Valley National Park.

Highest Dunes
The Eureka Dunes lie in the remote Eureka Valley, an enclosed basin at 3000 foot elevation located northwest of Death Valley. The dunes cover an area only 3 miles long and 1 mile wide, yet they are the tallest sand dunes in California, possibly the tallest in all of North America. They rise suddenly more than 680 feet above the dry lakebed at their western base. As tall as these dunes are, they are dwarfed by the impressive limestone wall of the Last Chance Mountains which rises another 4000 feet above the valley floor.

Singing Sand
The climb to the summit of the dunes is not an easy walk. All the slopes are steep and the loose sand gives way beneath your feet. At the top, the sweeping view seems reward enough for your efforts, yet if the sand is completely dry you may experience one of the strangest phenomena to be found in the desert, singing sand. When the sand avalanches down the steepest face of the highest dune, a sound like a bass note of a pipe organ or the distant drone of an airplane can be heard eminating from the sand. If the dune is at all damp (even though it may not feel so to the touch) no sound will be made. Why this occurs is not fully understood, but may have something to do with the smooth texture of the sand grains and the friction of those grains sliding against each other.

Island in the Desert
At first glance the Eureka Dunes appear desolate. What could possibly survive the hardships of this area? Plants and animals must endure the shifting sands, as a windstorm could bury them alive or expose them to the drying sun. The dry surface is deceptive, for dunes can hold water like a sponge. The Eureka Dunes receive more rainfall than others in the Death Valley area because their location at the western base of a mountain range that captures precipitation from passing storms. For perhaps 10,000 years these dunes have existed, providing a unique habitat for specialized lifeforms to evolve. The isolation of Eureka Dunes from other dune fields has led to the development of endemic species of plants and animals that are found nowhere else in the world. Besides 5 species of endemic beetles, 3 special

plants have their entire range limited to this island of sand.

- **Eureka Dunegrass** *Swallenia alexandrae*
  is often the only plant found on the higher slopes of the dunes. Its dense root system catches and holds drifting sand, forming stable hummocks. Stiff, spiny leaftips protect the plant from being disturbed by herbivores and careless hikers. Federally listed as an endangered species.
- **Eureka Dunes Evening Primrose** *Oenothera avita eurekensis*
  has large, white, night-blooming flowers to take advantage of pollenators such as moths that avoid the heat of day. When the leafy flower shoot is covered by windblown sand, roots sprout from the sides and a new rosette of leaves forms at the tip. Federally listed as an endangered species.
- **Shining Milkvetch** *Astragalus lentiginosus micans*
  reflects excess light and heat with a covering of silvery hairs to conserve moisture. This is a hummock -forming plant like the dune grass. Nodules on the roots gather nitrogen from the air, an important nutrient not available in the sand. Candidate for the Endangered Species List.

A Special Place

Eureka Dunes are clearly a special place. Please have respect when you visit. Lifeforms here may not be able to survive our carelessness. Try to choose activities that have the least impact on the land. Recreational activities such as sandboarding are not allowed on these delicate dunes. Camp away from the base of the dunes where most of the endemic plants and animals live. Most importantly, OFF ROAD VEHICLE TRAVEL IS NOT PERMITTED ON THE DUNES, or any where else in Death Valley National Park for that matter. Please keep your vehicle on established roadways.

Derham Giuliani worked hard to protect the Eureka Dunes from off-road vehicle use in the 1970s. Eventually, the dunes were closed. However, the decision was so unpopular that some local sheriff's deputies, and the sheriff at the time, refused to enforce it.

Booming Dunes

For centuries, explorers and naturalists throughout the world have described strange sounds emanating from sand dunes. Strange squeaking sounds are also produced by beach sand by simply compressing the sand with your foot or poking it with a rod. Some of the earliest references about "acoustical" dunes are found in Chinese and Mideastern chronicles dating back more than 1500 years. Marco Polo described weird sounds on a journey through the Gobi Desert, and Charles Darwin mentioned it while traveling through Chile. The sounds have been variously described as singing, whistling, squeaking, roaring and booming.

Some accounts compare the sounds with distant kettle drums, artillery fire, thunder, low-flying propeller aircraft, bass violins, pipe organs and humming telegraph wires. Low frequency sounds are produced when closely packed sand grains slide over each other, such as an avalanche down the slip face of a dune. The stationary sand underneath apparently acts as a giant sounding board or amplifier to produce the enormous volume of sound. The sand must be very dry for sound production, and under a microscope the grains appear more rounded and finely polished compared with ordinary (silent) sand. Astronomers and geologists have speculated that this remarkable phenomenon may be common in the windy and nearly waterless sand dunes on Mars!

Acoustical "booming" dunes are rather widespread on earth, including the Sahara Desert, Middle East, South Africa, Chile, Baja California and the Hawaiian Islands. California has at least two documented areas with booming dunes, the massive Kelso Dunes of San Bernardino County and the scenic Eureka Dunes of Inyo County.

Quartz sand grains compared with cubical crystals of ordinary table salt (NaCl). Left: Angular sand grains from the Algodones Dunes; Middle: Rounded, highly polished sand grains from Sand Mountain, a booming dune; Right: Cubical crystals of ordinary table salt.

One of the best places to observe booming dunes in the western United States is Sand Mountain, about 16 miles southeast of Fallon, Nevada. A short dirt road north of Highway 50 leads to the base of the massive white dunes. Sand Mountain is composed of two "seif" (sword-shaped) dunes whose summits stand about 390 feet (120 m) above the desert floor. To really appreciate this acoustical phenomenon you must climb to the crest of a dune and then slide down the steep slip face. Going down with an avalanche of sand is sort of like riding down an escalator, ankle deep in sand. As the sand begins to vibrate the sound becomes quite loud, like a low-flying B-29 bomber or squadron of World War II vintage fighter planes.

There are several interesting legends about the mysterious moaning of Sand Mountain. According to Mary Holliday (***Nevada Official Bicentennial Book***, page 137), a large sea dinosaur or plesiosaur once lived and frolicked with its mate in ancient Lake Lahontan. Strong winds piled the lakebed sediments into what is now called Sand Mountain, completely burying the dinosaur under hundreds of feet of sand. Today the dinosaur moans for its mate and the deep blue waters of Lake Lahontan.

Where to See Booming Dunes in the U.S.

Dryness is essential for sound production in booming sand. Rain or high humidity will eliminate booming completely. Hot, dry days are best to experience this remarkable phenomenon. For more information please refer to the article about booming dunes by Jerry Schad in ***Omni*** Vol. 1, 1979: pages 131-132.

1. **The Kelso Dunes** consist of 3 groups of large barchan (crescent-shaped) dunes, 7.5 miles (12 km) southwest of the town of Kelso in San Bernardino County. Access from either Interstate 15 or Interstate 40 is by way of the paved Kelbaker Road and a short segment of dirt road that passes within 1.2 miles (2 km) of the southern edge of the highest dune.

2. **Sand Mountain** in western Nevada lies 2.5 miles (4 km) north of US Highway 50, about 16 miles east of Fallon. A dirt road leads to the soft apron along its base. From here it is an easy walk to the dunes.

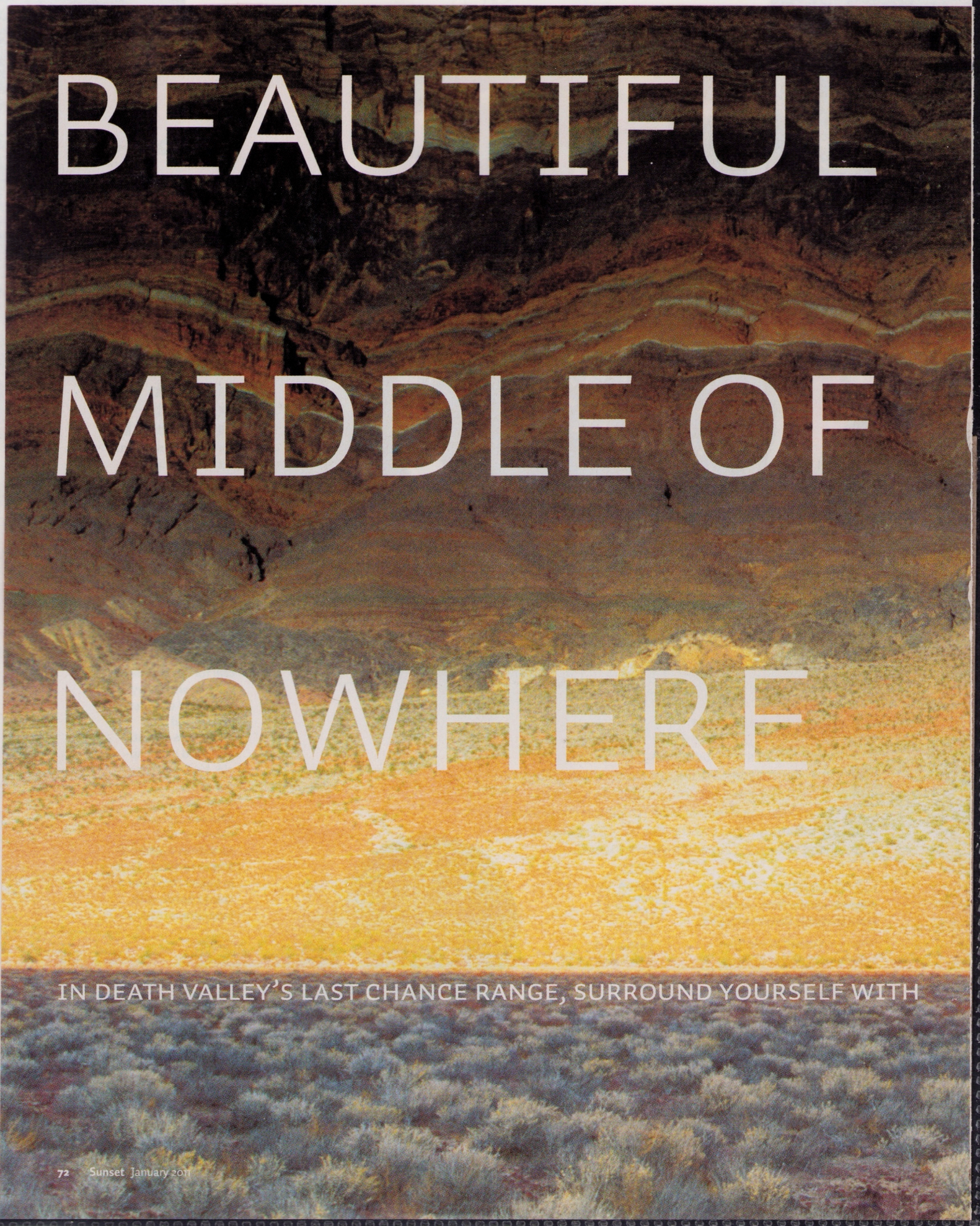
3. The Roaring Sands or Barking Sands on the west coast of Kauai, Hawaii, near Mana run parallel to the coast for a mile (1.6 km). They are unique because they consist of carbonate sand--water-worn and wind-blown fragments of shells and corals. Under a microscope (or hand lens) you can actually see the pieces of shells and corals. Most other booming dunes in the world are composed of quartz sand grains.

4. Back beach dunes on the island of Niihau, Hawaii are known for their booming sounds. Beach sands along the Baja California coast may also emit squeaking sounds when shuffling through the topmost layer of sand during the dry season. This is particularly true in the Cape region.

5. Booming has been reported for the **Eureka Dunes** in remote Eureka Valley of northeastern Inyo County, California. Highway 168 (Westgard Pass Road) heads northeast from Big Pine in California's scenic Owens Valley. About 6 miles (10 km) from Big Pine, a paved road to Eureka Valley goes to the east and north. The road turns into gravel and winds through Eureka Valley, through the Last Chance Range, and eventually connects with Ubehebe Crater in Death Valley National Monument. A bumpy dirt road at the southeast corner of Eureka Valley leads to the sand dunes. These are the tallest sand dunes in California and the home of the rare Eureka dune grass (Swallenia alexandrae) that grows no where else in the world.

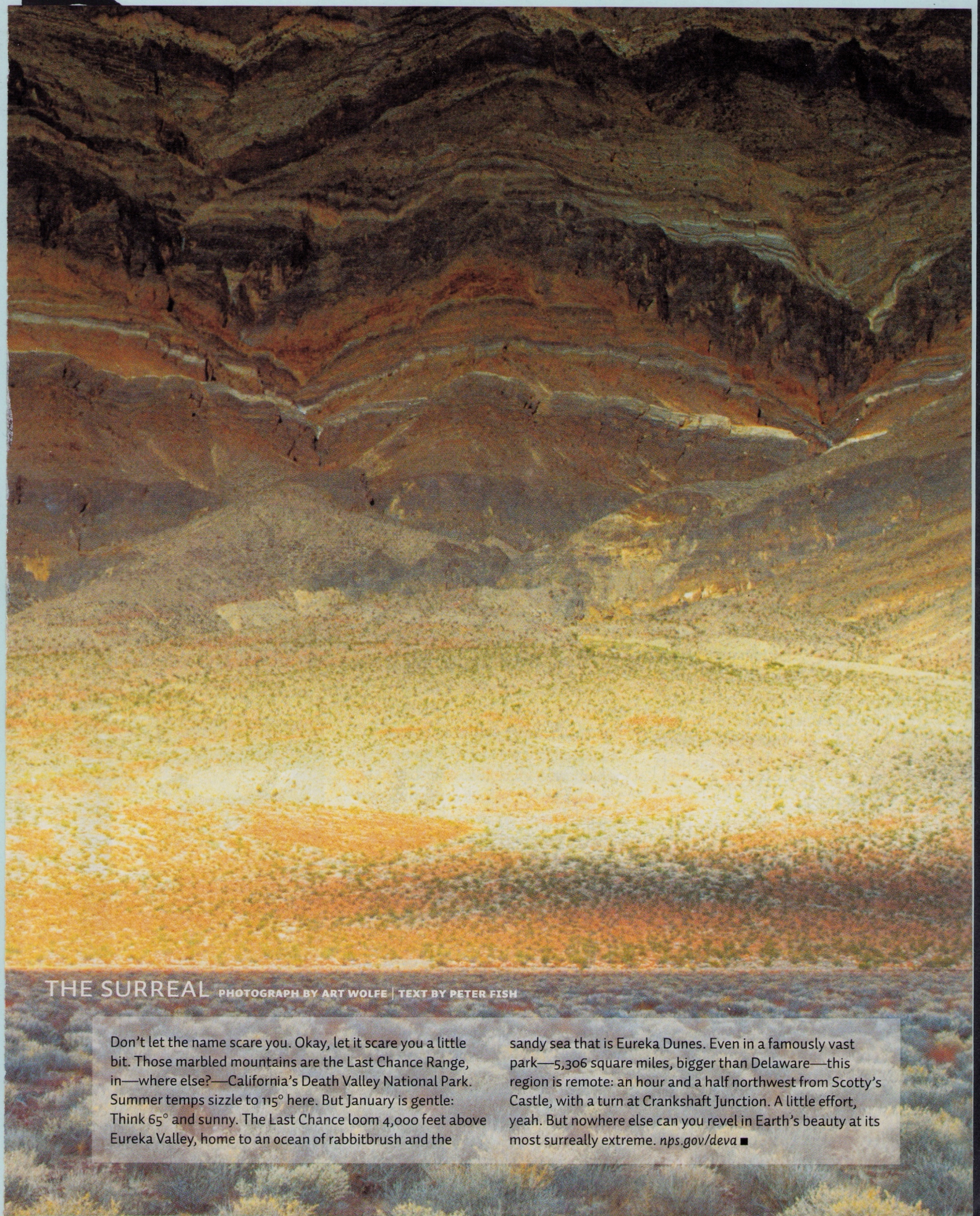
Eureka Dunes

by Enid Larson



BEAUTIFUL MIDDLE OF NOWHERE

IN DEATH VALLEY'S LAST CHANCE RANGE, SURROUND YOURSELF WITH



THE SURREAL

PHOTOGRAPH BY ART WOLFE | TEXT BY PETER FISH

Don't let the name scare you. Okay, let it scare you a little bit. Those marbled mountains are the Last Chance Range, in—where else?—California's Death Valley National Park. Summer temps sizzle to 115° here. But January is gentle: Think 65° and sunny. The Last Chance loom 4,000 feet above Eureka Valley, home to an ocean of rabbitbrush and the sandy sea that is Eureka Dunes. Even in a famously vast park—5,306 square miles, bigger than Delaware—this region is remote: an hour and a half northwest from Scotty's Castle, with a turn at Crankshaft Junction. A little effort, yeah. But nowhere else can you revel in Earth's beauty at its most surreally extreme. *nps.gov/deva* ■

SAND DUNES
DEATH VALLEY NATIONAL PARK

Many first time visitors to Death Valley are surprised it is not covered with an endless sea of sand. Less than one percent of the desert is covered with dunes, yet the shadowed ripples and stark, graceful curves define "desert" in our imaginations. For dunes to exist there must be a source of sand, prevailing winds to move the sand, and a place for the sand to collect. The eroded canyons and washes provide plenty of sand, the wind seems to always blow (especially in the springtime), but there are only a few areas in the park where the sand is "trapped". The sand dunes of Death Valley National Park are excellent places for nature study and recreation, but OFF-ROAD VEHICLE TRAVEL IS NOT PERMITTED.

1. EUREKA DUNES

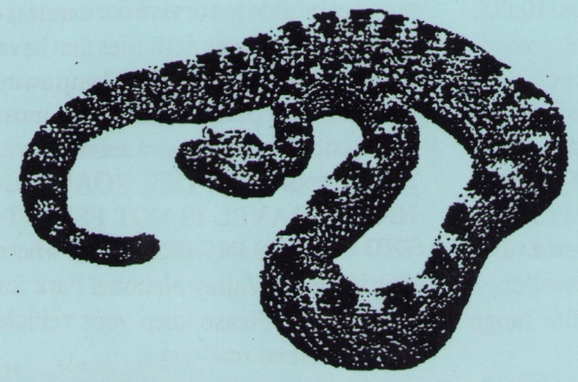
Eureka Dunes are accessable by most standard vehicles via the Death Valley / Big Pine Road. From the Ubehebe Crater Road you must travel 44 miles of graded dirt to the dunes. From the town of Big Pine there are 28 miles of paved road and 21 miles of graded dirt to the dunes. The final 10 miles of both routes is the narrow South Eureka Road. During inclement weather, all access to Eureka Dunes can be closed or limited. No water or services are available along this route.

2. SALINE VALLEY DUNES

Gently rippling up from the edge of salt flats, these low dunes cover a large area, yet go unnoticed by most visitors to this remote valley. The Inyo Mountains tower nearly 10,000 feet above. The long, rough drive into Saline Valley limits casual visits, so come prepared. Winter snows and flashfloods can temporarily limit access.

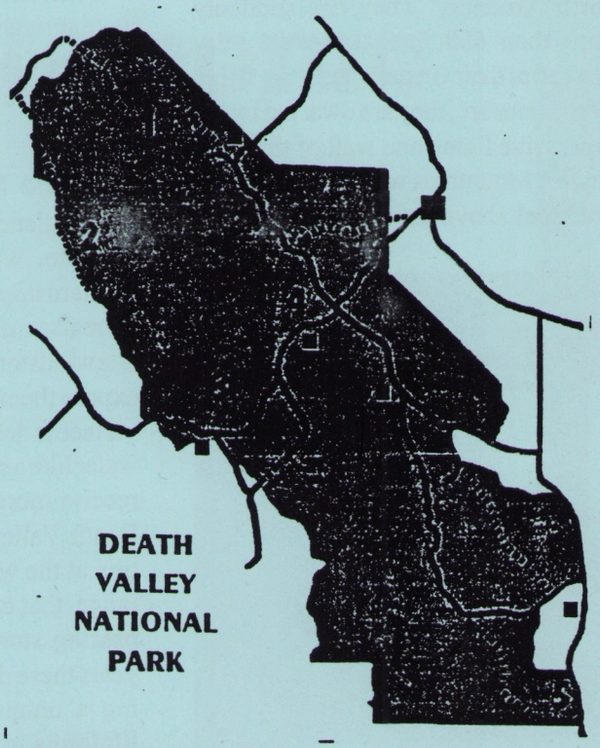
3. PANAMINT DUNES

Travelers crossing Panamint Valley on Hwy. 190 may view these dunes as a distant, pale smudge to the north. Those wanting a closer look must drive the unmarked, dirt road leading to the Big Four Mine, then hike cross-country 3 miles. The other dunes of Death Valley are all situated on flat valley floors, but these are perched on a slope. The view from the summit of these dunes reveals their star shape and an impressive view down the valley.



4. DEATH VALLEY DUNES

These dunes are the best known and easiest to visit in the national park. Located in central Death Valley near Stovepipe Wells, access is from Hwy. 190 or from the unpaved Sand Dunes Road. Although the highest dune rises only about 100 feet, the dunes actually cover a vast area. This dune field includes three types of dunes: crescent, linear, and star shaped. Polygon-cracked clay of an ancient lakebed forms the floor. Mesquite trees have created large hummocks that provide stable habitats for wildlife.



5. IBEX DUNES

Visitors to Saratoga Springs may notice these dunes, but they are shielded from paved roads by rocky desert hills. Hike about one mile from the Saratoga Springs Road for access. An old talc mine at the base of the Saddle Peak Hills overlooks the dunes from the east. The Mojave fringe-toed lizard lives on these dunes.

LAST CHANCE MTNS. 1998

1992

Ivy 1992

Bob 1992

Bob 1998

July 1998

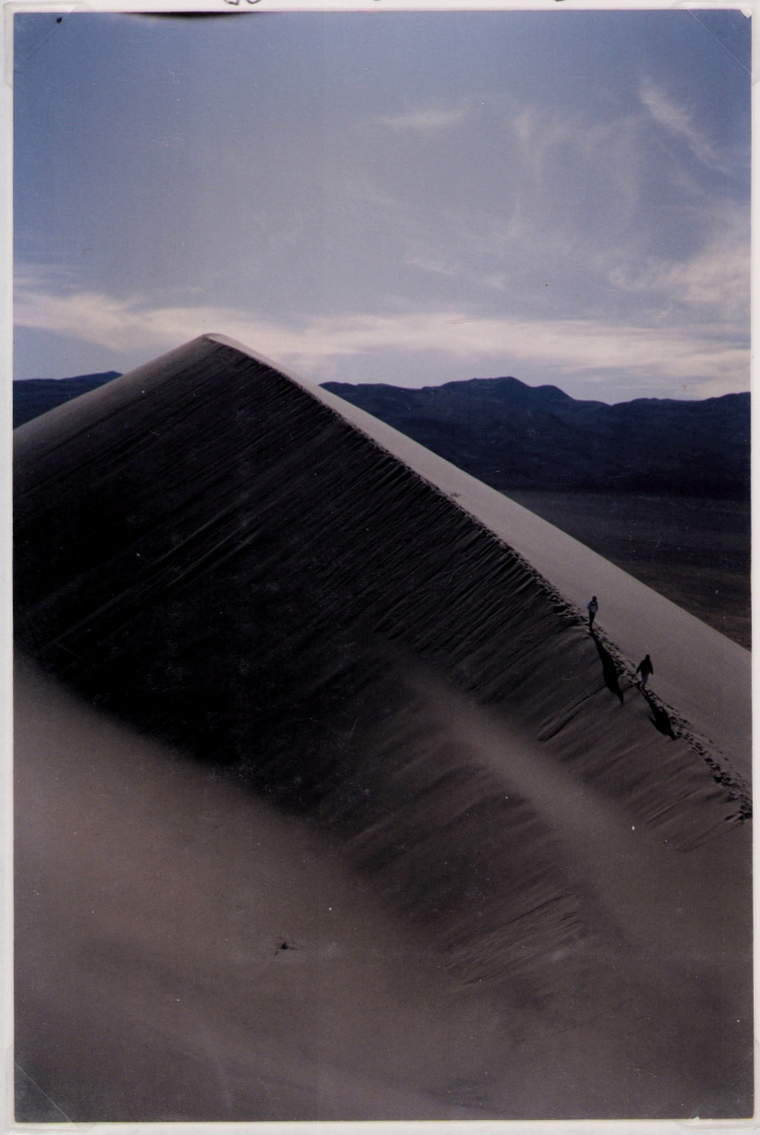
Bob, Abby, Olivia, Jeff 2009

Olivia, Jeff, Abbys Foot, Bob 2009

Eureka Valley 2009

White Mt. ← Pk.

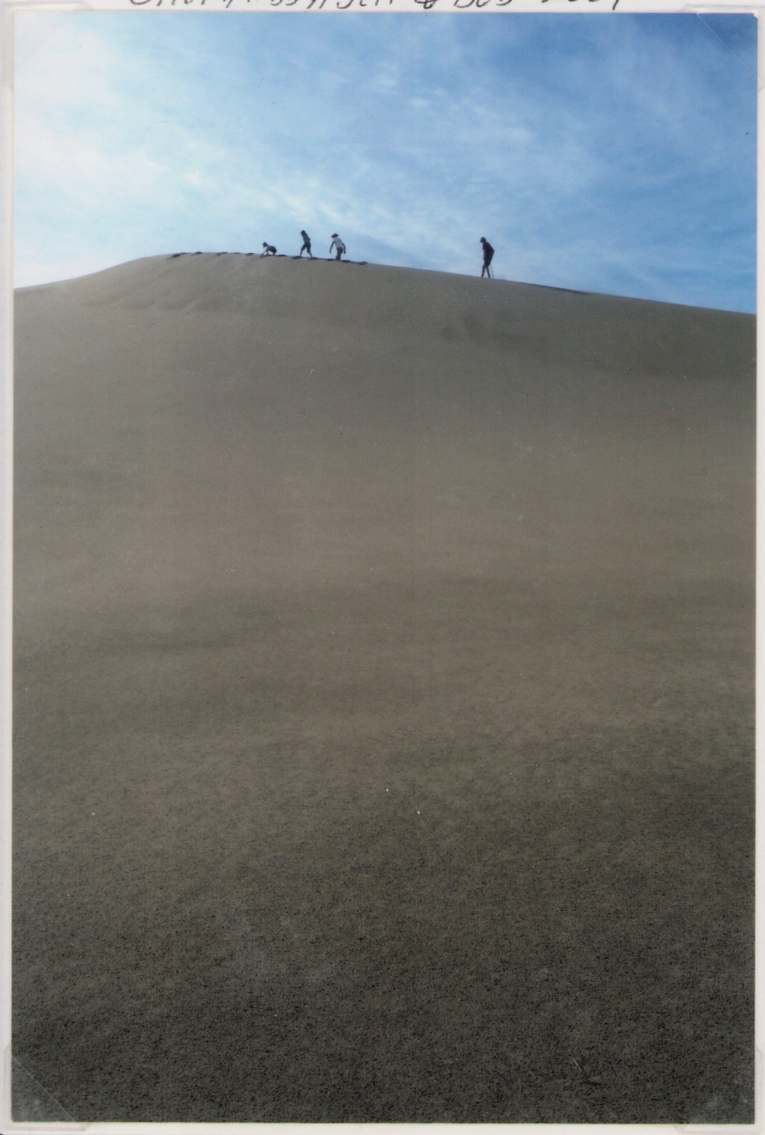
Joan & Jeff 1993



Jeff, Bob & Abby 2009

Bob, Olivia, Abby, Jeff 2009

Olivia, Abby, Jeff & Bob 2009



Olivia 2009

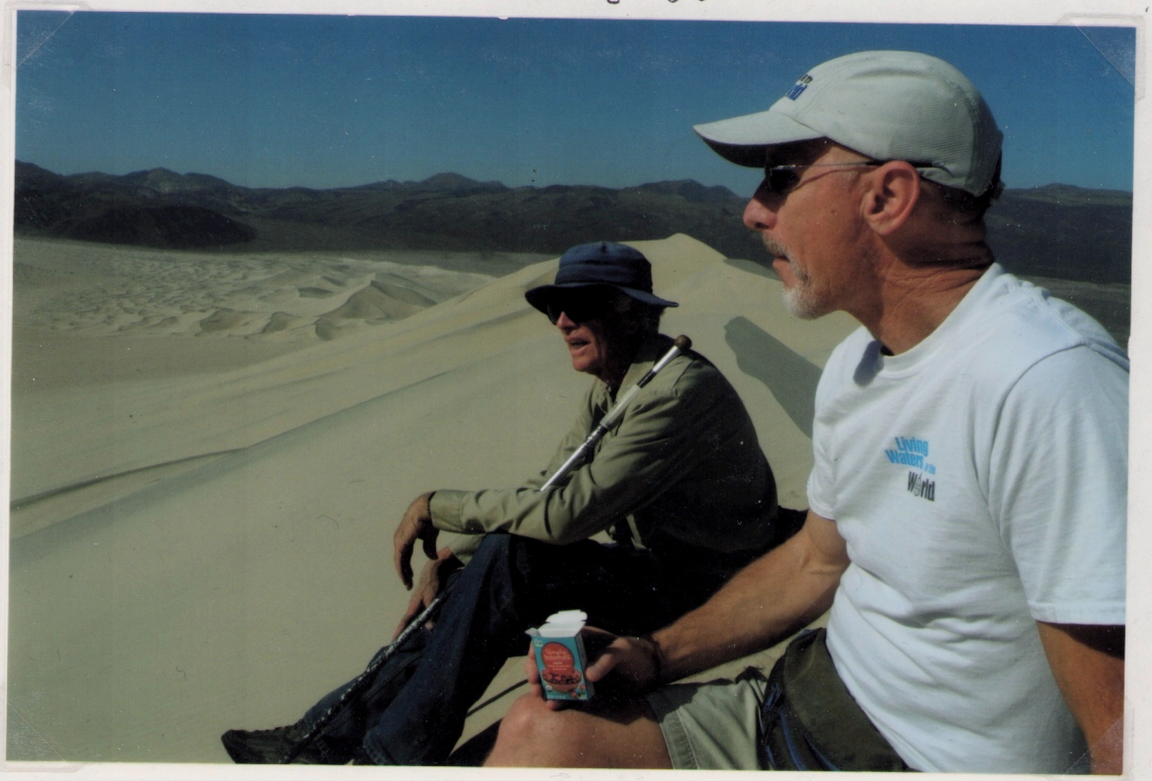
2009

Bob, Abby, Jeff, Olivia 2009

Olivia 2009

Jeff, Abby, John, Olivia 2009

Bob & Jeff



2016

Jeff

Bob

A DAY AT THE DUNES

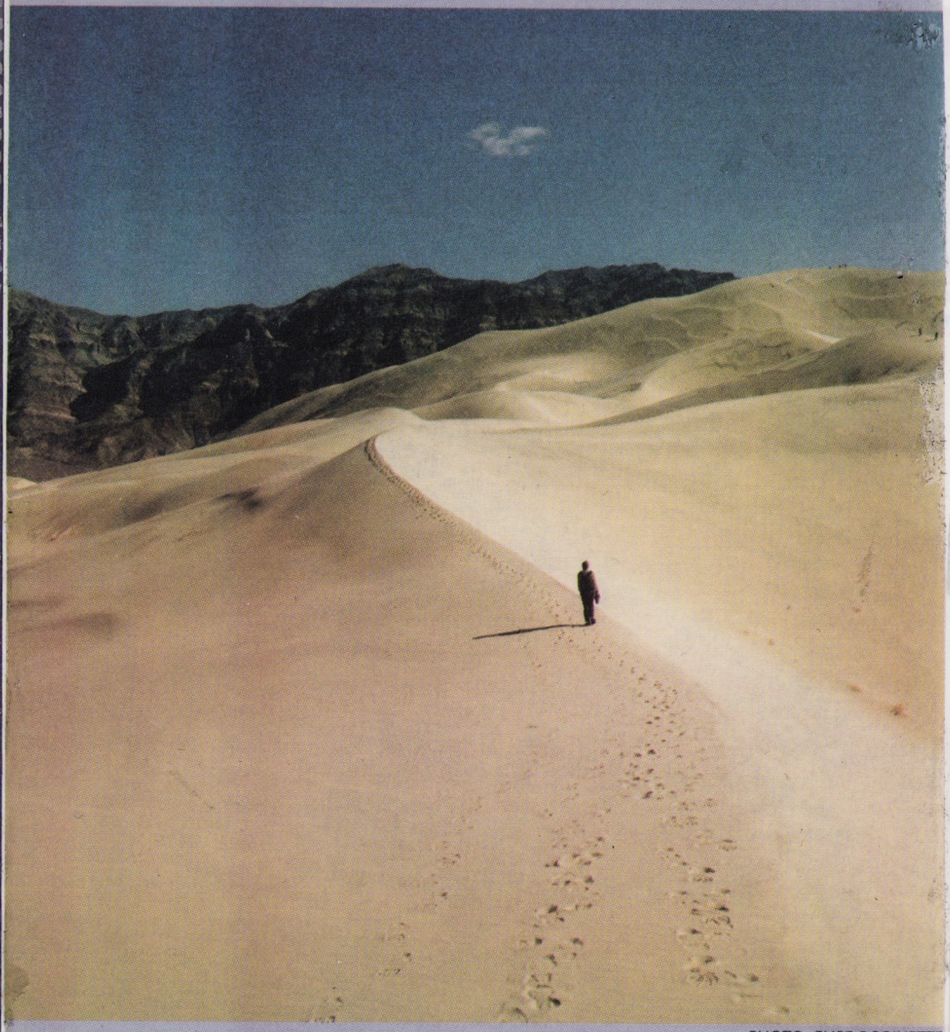


PHOTO: ELISE ROBINETTE

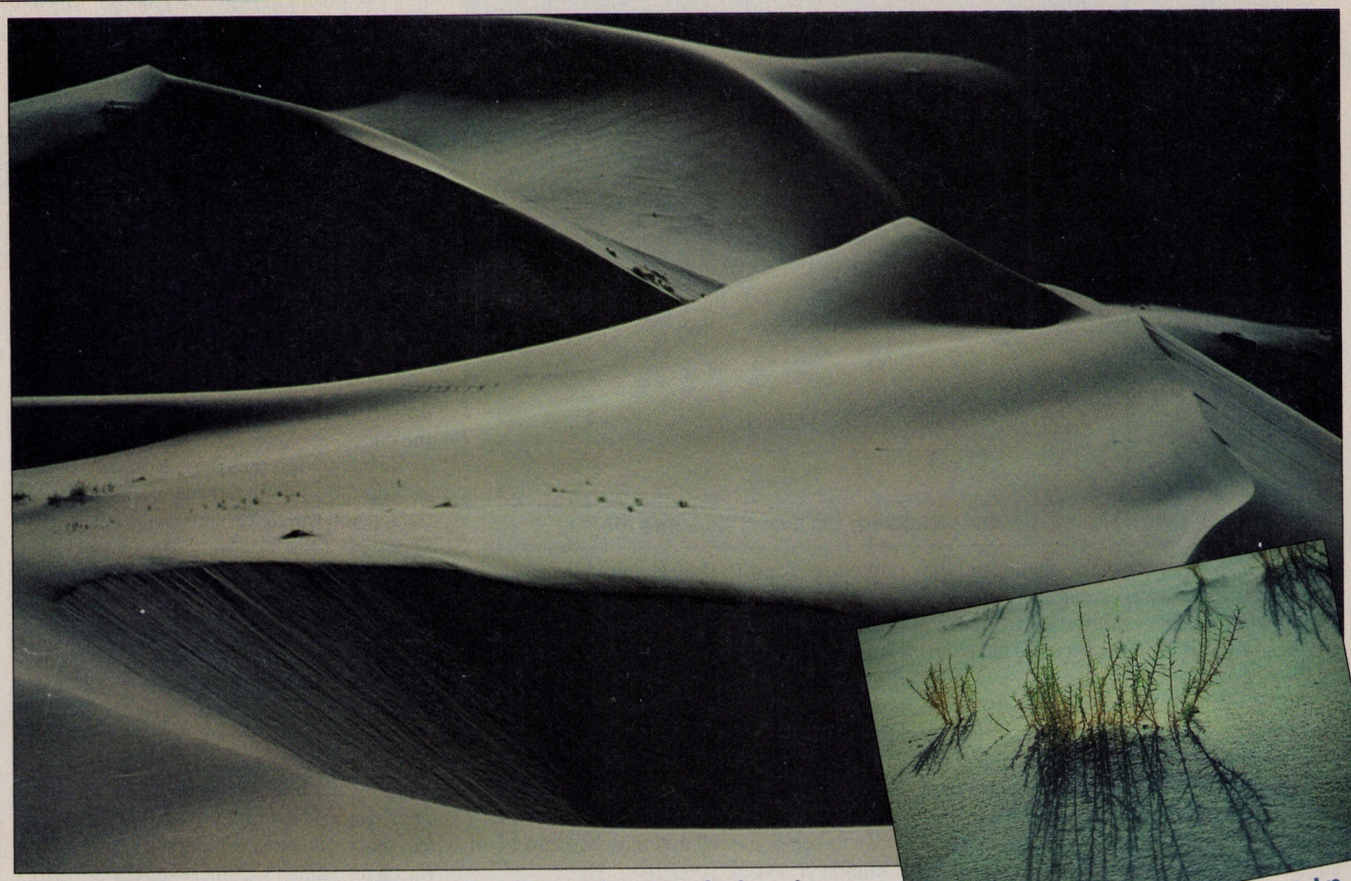
Death Valley's Eureka Dunes were a perfect getaway during Mammoth's busy holiday weekend. Here local Andrew Skaggs treks up to the highest point of the dunes.

PHOTO : SHERRY TAYLOR

Skaggs sleds down. With him are Elise Robinette, Bill Taylor, Davis Taylor, and Vane.

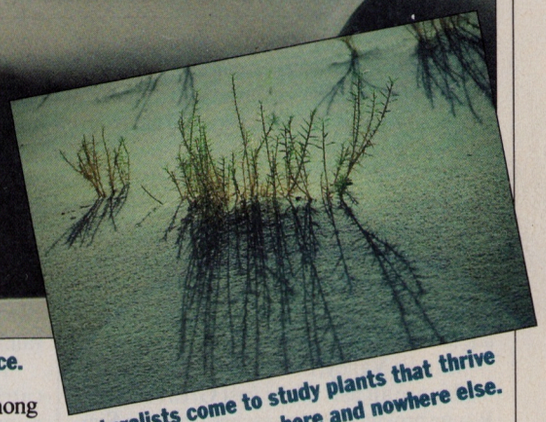
12-5-2015

BOB LARSON 2015



Photography by Stuart Weiss

The spectacular slopes of the Eureka Dunes offer sensuous beauty and primeval peace.



Naturalists come to study plants that thrive here and nowhere else.

time, you can even test your strength in the beer keg throwing contest.

The interest in handmade beers and ales continues to follow the same path as wines from small wineries. It is probably no coincidence that both California brew pubs (a third is planned in the heart of the Napa Valley by Phil Rogers, owner of the Calistoga Inn) are in wine country; after a long day tasting young wines, winemakers like nothing more than a refreshing glass of hearty beer or ale.

Buffalo Bill's Brewery, 1082 B Street, Hayward (886-9823). Open weekdays from 11 a.m. to 11 p.m.; Saturday from 11 a.m. to 2 a.m.; Sunday from 2 p.m. to 6 p.m.

The Hopland Brewery, 13351 South Highway 101, Hopland (707-744-1361). Open Friday and Saturday from 11 a.m. to 2 a.m.; weeknights and Sunday from 11 a.m. to midnight.

GERALD D. BOYD

Eureka Dunes: Stark Sands, Sparkling Skies and Solitude

Last Chance Range, Last Chance Canyon, Last Chance Spring—the message is clear to any who would explore the desert valleys and mountains beyond the shadow of the High Sierra, among the most remote, trackless, desolate, parched and strangely beautiful land forms in California. Yet this desert is not only threatening; in its silence, solitude, sand, sky and mountains, it simplifies life, and a winter's day exploring the slopes and sands can be deeply peaceful and cleansing.

Some 450 miles southeast of San Francisco, these desert fastnesses are as unfamiliar to most people today as they were in July of 1871, when a weather-wasted, exhausted band of army explorers looked out over them in a desperate search for water.

Their story gives a human context to the place: A detachment of the Wheeler Survey—a topographer, two civilians, two soldiers, a guide, a packer with four mules, an Indian and their leader, Lieutenant Lyle—were bivouacked at Camp Independence, now the town of Independence. Their orders were to reconnoiter a passage eastward over the deserts and mountains between the Owens River in California and the Amargosa River (meaning "bitter water of the desert") in what is now Nevada.

Ignoring discouraging accounts of the dangers of a trek through country virtually destitute of water after the Inyo Range, the intrepid band ascended the Inyo Mountains through Mazourka Canyon, crossed the range, then set out over a rocky, volcanic divide between the Saline and Termination valleys. "The latter was some fifteen or twenty miles long," Lyle wrote in his diary, "having heavy sand hills, over which the trail led, the mules sinking knee-deep at every step."

By day's end the company had crossed Eureka Valley and begun to climb what they named the Last Chance Range. Ascending a peak, Lyle described the daunting country beyond: "Range after range of black ridges, their walls like sides banded with white, red and yellow strata, reared their frowning crests, and seemed to impose an impassable barrier to further progress."

The parched band finally found a summit passage down over loose rocks and 30-foot slate falls. They finished the last of their water and dared not eat any meat as the salt would increase their burning thirst. When they had almost given up hope of finding water, they spotted a patch of green at the northern end of Death Valley—a patch that remains on the map today just as they christened it then: Last Chance Spring.

Not much of note has happened in Eureka Valley since. There haven't been any gold strikes or any visitor centers—indeed,

Stuart Weiss

"In its silence, solitude, sand, sky and mountains, the desert simplifies life."

there is no water, no trees, no shade, and the dirt road across the valley can swallow a car in mud after a summer flash flood, or burn through shoes as the summer sand heats up to 170 degrees.

But in winter there is also the solitude and primeval remoteness of an unspoiled desert, clear air, cool days, exotic wildflowers whose splashes of color stand out against the stark sands, an enormous night sky filled with sparkling gem-stars and the spectacular, sensuous Eureka Dunes.

Eureka Valley, Saline Valley and Death Valley are all part of the vast Great Basin Range province that stretches from the Sierra Nevada to the Colorado Plateau. The entire region has been subject to intense faulting from early geologic time and remains so today. Eureka Valley is a down-faulted basin surrounded by fault-block mountains—the Inyos to the north and west, the Salines to the south, and to the west the naked, colorfully banded cliffs of the Last Chance Range. The bands are metamorphosed layers of sediments laid down in a warm, shallow sea more than 500 million years ago when this place was far to the south. They include sandstone, quartzite, siltstone, limestone and dolomite.

More recent volcanic eruptions of tertiary times (2 to 65 million years ago) covered much of the Inyo and Saline mountains with rhyolite and basalt flows. The great bubbles of impermeable granite that form much of the Sierra also upwelled under Eureka Valley and blocked the flow of underground water, accounting for the lack of springs. In wetter times, the closed basins of Eureka Valley, Death Valley and others were filled with deep freshwater lakes. Their presence is now marked by playas, dry lake beds and wave-cut terraces.

For thousands of years, rain storms, especially in the summer, have eroded the mountains; infiltration is minimal, so runoff is rapid. Large alluvial fans have filled the valley floor, especially in the southern end, to depths of up to thousands of feet.

The spectacular sand mountain at the southern end of Eureka Valley is the highest dune in the Great Basin and perhaps in North America. Reaching 700 feet above the valley floor, the stark white dunes started forming before the great glaciers of the Sierra began to melt and may be almost two million years old.

For eons, north to northwest winds have carried sand into Eureka Valley, especially during the spring. Blocked by the Last Chance Range, they swirl around the southern dry lake bed and slow down to less than 23 miles per hour, the velocity needed to carry sand grains. During a sandstorm, blowing sand restricts visibility to almost zero up to a height of about five feet; above that, it may be almost clear. The grains are not blown long distances but are rolled or bounced along.

In appearance, the Eureka Dunes seem a single complex longitudinal dune, with long, parallel, sinuous ridges. While the overall shape is remarkably constant, the configuration is ever changing. The system is about three miles long and half a mile wide, with the high point to the north. The dunes are mostly quartz grains of comparatively large size; the finer dark and heavier grains are magnetite, hornblend, augite and olivine, which are of igneous origin.

The adaptability of living creatures to this environment is fascinating; in fact, the main thing that holds this sand mountain together is vegetation. Naturalists come to the dunes to study plants and animals that thrive here and nowhere else; Eureka Dunes Grass (*Swallenia alexandrae*) and Eureka Dunes Evening Primrose (*Oenothera avita eurekensis*) grow only here, and the Shindug locoweed (*Astragalus Lentiginosus micans*) is found in only a few other locations nearby.

Nocturnal creatures abound, their activities cloaked by the blackness of the desert night. A morning walk reveals a delightful array of tracks, trails, curlicues and tiny footprints—some ending suddenly—made by such inhabitants as the darkling beetle, kangaroo rat, pallid kangaroo mouse and fringe toad. Prairie falcon, golden eagle, great horned owl and white-throated swift are among the permanent residents of the Last Chance Mountains, while mockingbirds, Le Conte's thrasher, phainopepla, horned lark and Sayornis phoebe breed near the dunes.

There are no trails here. You can walk around the dunes in a few hours or climb to the top and watch the sun set—your tracks erased after the next wind. As the sun sinks, the dunes turn a luscious pink and shadows play on the lee side of the sinuous ridges.

Winter days at the Eureka Dunes are cool with cold nights; spring is lovely but the winds can be strong; summer is very hot and brings the possibility of flash floods; in autumn, the weather is usually perfect.

In the early months of the year, the constellation of Orion shines brilliantly in the clear, quiet desert night. And this is the perfect place, where time seems to stand still, to watch for Halley's Comet—as our ancestors have and as our children's children will.

The road into Eureka Valley is an unpatrolled secondary road and is partially dirt. Always carry extra water, food, blankets, a small shovel and chains in your car. And stay on the main dirt road. Snow can fall in the mountains and the valley dirt road can become impassable. Always check ahead.

To get to the Eureka Dunes from San Francisco, take Route 80 to Route 50, across the Sierra to Route 395 (or Route 50 to Route 89 to Route 395), then proceed south on 395 towards Big Pine. Just north of Big Pine, head east on Route 168 for 2.1 miles to a signed, paved road on the right: "Death Valley, pavement ends 24 miles ahead." You pass through a fantastically eroded gorge, pinon-juniper forest and Joshua trees, then descend into Eureka Valley; 27.7 miles from Route 168, the road becomes dirt. Enter Eureka Valley 8.3 miles ahead and bear right at a signed dirt road; the dunes are 9.6 miles ahead.

The road over the Last Chance Mountains to Death Valley is passable for two-wheel-drive vehicles, but proceed with caution; the road becomes poor ahead. Stay on the main dirt road, and call ahead for road conditions.

For further information on the Eureka Dunes area, contact the Bureau of Land Management, 112 East Dolphin Street,

EUREKA VALLEY, NAMED BY LIEUTENANT GEORGE M. WHEELER, UNITED STATES ENGINEERS, AS "TERMINATION VALLEY" IN OR SLIGHTLY BEFORE 1871:

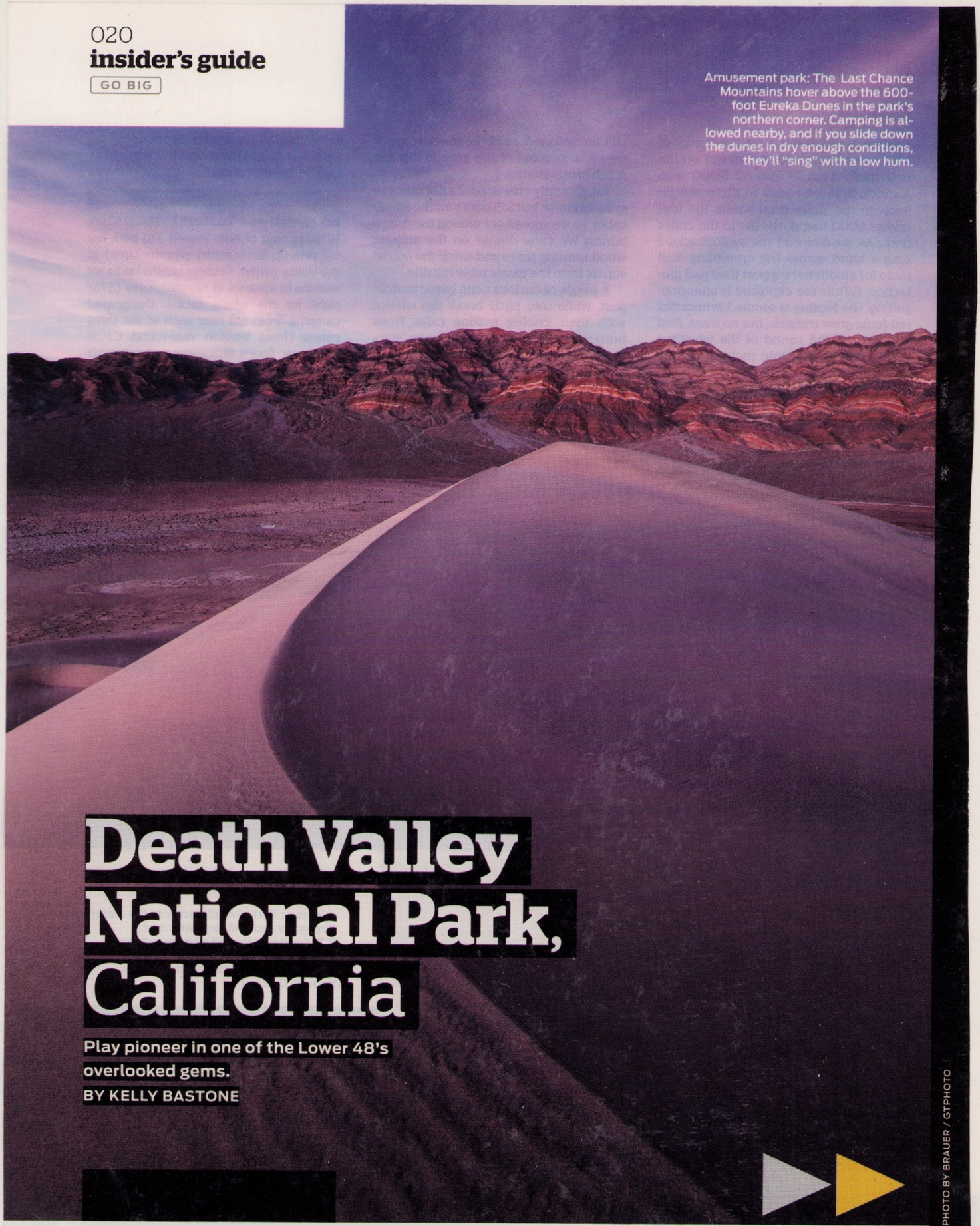
D. A. Lyle, Second Lieutenant, Second Artillery, Adjutant of the Expedition, tells of a trip across Termination Valley in July, 1871:

"Immediately upon my arrival at Camp Independence I fitted out a small party of picked men and carefully selected animals, to run a reconnaissance line to what was known as the head of the Amargosa. The object of this line was to determine whether or not a passage could be found directly to the eastward over the sterile deserts and mountains intervening between the Amargosa and Owens River that was practicable for a large train of men and animals(this was for the purpose of procuring data for the expedition).
"At noon on July 21, 1871, we left Camp Independence, and passing through the town of Independence, crossed Owens River at Bend City (now deserted), and ascended the mountains through Mazourka Canon. Fifteen miles up we camped at an excellent spring; grass and wood plenty. Next day crossed the range and camped in a deep rugged canon filled with blocks of granite, and very narrow."(It was during the next two days that they lost the guide, Hahn, and suffered greatly in trying to find him. Space does not permit this whole story).
"July 24, at 5 a.m., Hahn not returning, I set out upon his trail to the northeast, hoping to meet him. This trail led over a rocky, volcanic divide, separating Salinas from Termination Valley, which latter was some fifteen or twenty miles long, having heavy sand-hills, over which the trail led, the mules sinking knee-deep at every step. The day was excessively hot. The wind, passing over the heated sand-hills, came in scorching gusts, rendering our sufferings intense and our thirst almost intolerable, while the incessant glare of the sun upon the white sand nearly blinded us and caused great pain in our eyes and heads after the first few hours. At 4 p.m. we struck the slope leading up to the foothills."(The rest of the day was a terrible experience for the men; no water, exhausted, dehydrated, and suffering. They made camp without water, unable to find a way through the mountains. At daybreak the next morning they were on their way, finding a canon that appeared passable,"Last Hope Canon". The canon became even more difficult; packs unloaded and let down the canon by rope. Finally water was found in this Break Neck Canon, and named, "Last Chance Spring".

This is the story as written by Lieutenant Lyle as he crossed Termination Valley, just north of the big sand dune, and went on to the northeast to find a way through the mountains which became known as the Last Chance Mountains from the spring which Lyle and his men found and which perhaps saved the lives of himself and men.

---Cragen

BACK TO TERMINATION OR EUREKA VALLEY: We believe Wheeler and Lyle named the Valley, Termination, because it appeared to be the end, "no way out".



Amusement park: The Last Chance Mountains hover above the 600-foot Eureka Dunes in the park's northern corner. Camping is allowed nearby, and if you slide down the dunes in dry enough conditions, they'll "sing" with a low hum.

Death Valley National Park, California

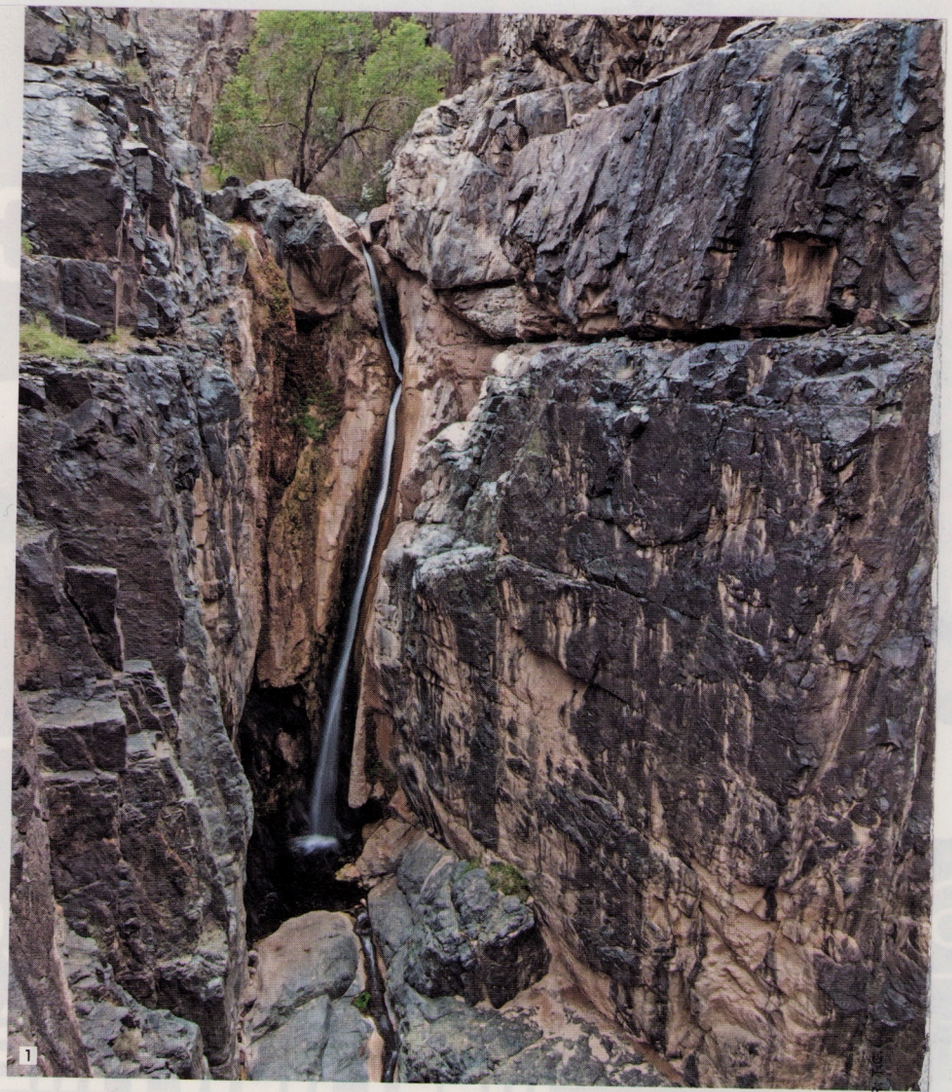
Play pioneer in one of the Lower 48's overlooked gems.

BY KELLY BASTONE

PHOTO BY BRAUER / GTPHOTO

The Payoff

You know Death Valley is the lowest, hottest, and driest spot in North America. But few visitors expect the kaleidoscopic color that enlivens its badlands, slots, and mountainsides. At 3.4 million acres, Death Valley is the largest national park south of Alaska. And like that state, it's still a frontier. Humans haven't yet plumbed all its passageways—just last year, canyoneers in the Grapevine Mountains discovered 60-foot-high Moonlight Bridge. It's an explorer's treasure-trove—and its desert expanses are anything but barren.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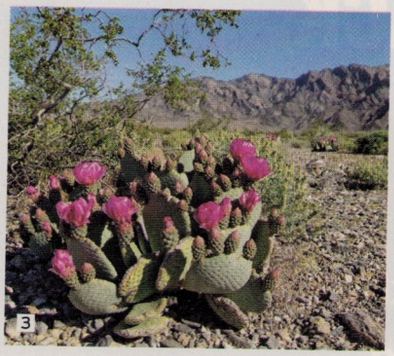
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Your guide
When he needs a break from logging long hours in the fiber optics lab, Stanford University professor Michel Digonnet goes on exploratory missions in the Mojave Desert: He's hiked 12,500 miles in and around the park, most of them off-trail, and written two guidebooks about the area.

Winter sunshine
Mild temps from mid-October through mid-March (averaging 77°F highs in November) make winter the best time to log long hikes. Winter also offers the most dramatic scenery, Digonnet says. "The longer shadows create 3D relief and let you appreciate the desert's colors, which look washed-out in summer."

Carry water.
With few streams and springs, Death Valley offers little opportunity for multiday expeditions: Day trips and one-nighters are *de rigeur*. Even in winter, carry a gallon of water per person per day (Digonnet likes to cache a gallon about a third of the way into his hikes). Keep at least 5 gallons in your car.

Dayhike a seldom-seen slot.
Not far from park HQ at Furnace Creek—yet overlooked by the vast majority of visitors—sit Funeral Canyon's contorted slots. "It's a spooky place, with walls that twist and curve so you can't see much of the sky," Digonnet says. From the northern edge of Texas Spring Campground, enter the unsigned, dry wash and hike upstream through gravel flats and mud hills. At 2.3 miles, the wash narrows and enters pockmarked, pink walls that grow as the canyon constricts to 5 feet wide. A pourover 4 miles in marks the turnaround.

Best peak
Digonnet's favorite summit is also near Furnace Creek, via a 7.8-mile

PHOTOS BY (FROM LEFT) ISTOCKPHOTO.COM / ADIBILIO; MARCUS REINKENSMEYER; MARK WEBER; ISTOCKPHOTO.COM / BADALATO

1 Reach 50-foot Upper Darwin Falls by scrambling up a scree slope to the right of the lower falls. 2 Catch this vista across Badwater Basin on your way to Mt Perry. 3 Beavertail cactuses bloom in March and April. 4 Scientists recently solved the mystery of Racetrack Playa's moving rocks. Details: **backpacker.com/insider.**

(round-trip) dayhike. "Mt. Perry offers one of the most spectacular views in North America," he raves. "From this 5,716-foot summit, you can see all of Death Valley." From the Dantes View overlook, hike north along the ridge for .4 mile to Dantes View Peak, a scrubby knob where most trekkers turn around. But by continuing north along the ridge for 3.5 off-trail miles (and 3,300 feet of cumulative elevation gain), you get a ship's-prow view over a vast, russet-colored sea of plains and mountains dissolving into the horizon.

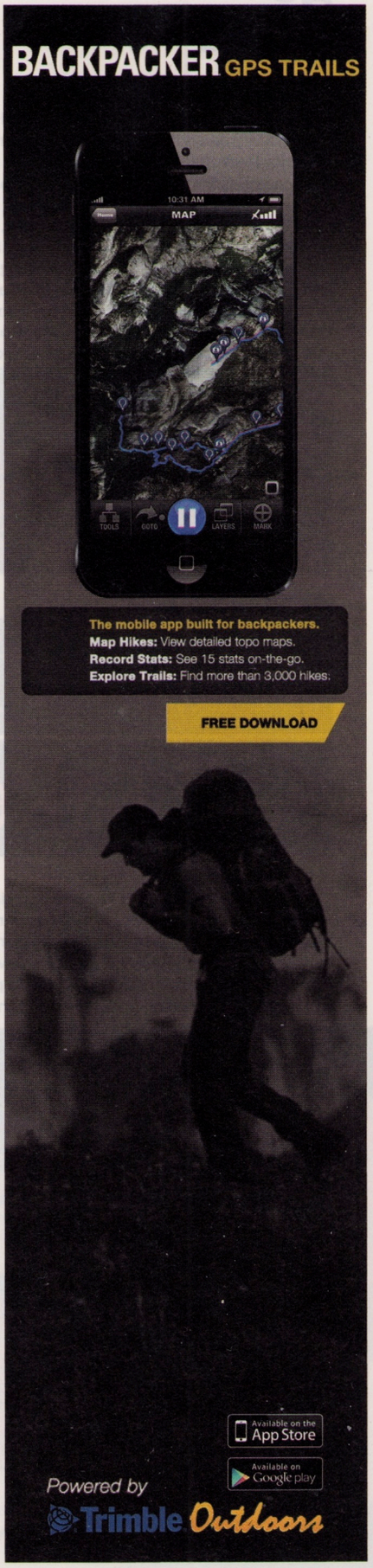
Discover a ghost town. Beveridge, an abandoned 1860s gold-mining village just outside the park, deserves bucket-list status for its idyllic canyon setting and super-tough access. But the arduous trip to the legendary oasis keeps almost everyone away. Commit two days to driving to and from the trailhead, plus two epic days of hiking (7 to 9.5 miles one-way, depending on how far your car makes it), and you're rewarded with "the best backpacking trip in the Mojave," promises Digonnet. "It's one of the few places around that can't be reached with a car or a dayhike."

The payoffs: views over the Saline Valley's immense flats framed by jagged peaks, near-certain solitude, and streamside camping in forested Beveridge Canyon (water is the site's key attraction, then and now). On the eastern edge of the Inyo Mountains, follow the rough, 4WD Snow Flake Mine Road up 2,000 feet in 2.5 miles to the Beveridge Ridge trailhead. Pick up the faint Beveridge Ridge Trail and head west, climbing up 50 percent grades to 6,700 feet, then switchback down through the pines of Beveridge Canyon. Willows shade orchids that bloom along the stream (peaking in May; pack bug repellent) and rose bushes have nearly reclaimed the smattering of abandoned cabins.

Desert waterfall Also on the park's western edge (near Panamint Springs), Darwin Falls makes for a rewarding stop on its own or after a Beveridge epic. From the trailhead in Darwin Wash, hike south then west for .8 mile to where the canyon narrows and cattails grow thick. Continue .3 mile farther, crisscrossing the 8-inch-deep stream before arriving at a deep pool fed by 18-foot-high cascades and surrounded by fern-covered cliffs (no camping or swimming).

Trip Planner Go October through March for mild temperatures; February and March for spring wildflowers (the best shows fill Badwater Basin, on the edge of the Black Mountains, after exceptionally wet winters). **Get there** Furnace Creek is 150 miles west of Las Vegas, NV. **Permit** Free, but required for backcountry camping; available at Furnace Creek Visitor Center and Stovepipe Wells Ranger Station **Guidebook** *Hiking Death Valley* and *Hiking Western Death Valley National Park* by Michel Digonnet ($20 each; desertusa.com) **Map** *Death Valley National Park* ($12; natgeomaps.com **Contact** nps.gov/deva

WALK ON GET MORE HIKE IDEAS IN OUR IPAD EDITION AND AT BACKPACKER.COM/INSIDER.



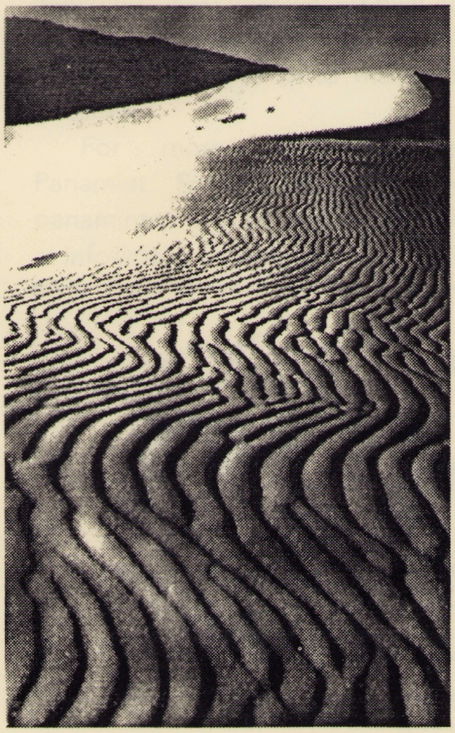
EUREKA DUNES

Death Valley

A pale mountain of sand appears to hover over the flat valley floor. Rugged cliffs loom high above, boldly striped with pink, gray, and black. The distant yipping of a coyote is interrupted by a mysterious rumbling sound emitting from the dune itself. Welcome to Eureka Dunes, one of the newest additions to Death Valley National Park.

THE HIGHEST DUNES

The Eureka Dunes lie in the remote Eureka Valley, an enclosed basin at 3000 foot elevation located northwest of Death Valley. The dunes cover an area only 3 miles long and 1 mile wide, yet they are the tallest sand dunes in California, possibly the tallest in all of North America. They rise suddenly more than 680 feet above the dry lakebed at their western base. As tall as these dunes are, they are dwarfed by the impressive limestone wall of the Last Chance Mountains which rises another 4000 feet above the valley floor.



SINGING SAND

The climb to the summit of the dunes is not an easy walk. All the slopes are steep and the loose sand gives way beneath your feet. At the top, the sweeping view seems reward enough for your efforts, yet if the sand is completely dry you may experience one of the strangest phenomena to be found in the desert, singing sand. When the sand avalanches down the steepest face of the highest dune, a sound like a bass note of a pipe organ or the distant drone of an airplane can be heard eminating from the sand. If the dune is at all damp (even though it may not feel so to the touch) no sound will be made. Why this occurs is not fully understood, but may have something to do with the smooth texture of the sand grains and the friction of those grains sliding against each other.

AN ISLAND IN THE DESERT

At first glance the Eureka Dunes appear desolate. What could possibly survive the hardships of this area? Plants and animals must endure the shifting sands, as a windstorm could bury them alive or expose them to the drying sun. The dry surface is deceptive, for dunes can hold water like a sponge. The Eureka Dunes receive more rainfall than others in the Death Valley area because their location at the western base of a mountain range that captures precipitation from passing storms. For perhaps 10,000 years these dunes have existed, providing a unique habitat for specialized lifeforms to evolve. The isolation of Eureka Dunes from other dune fields has led to the development of endemic species of plants and animals that are found nowhere else in the world. Besides 5 species of endemic beetles, 3 special plants have their entire range limited to this island of sand.

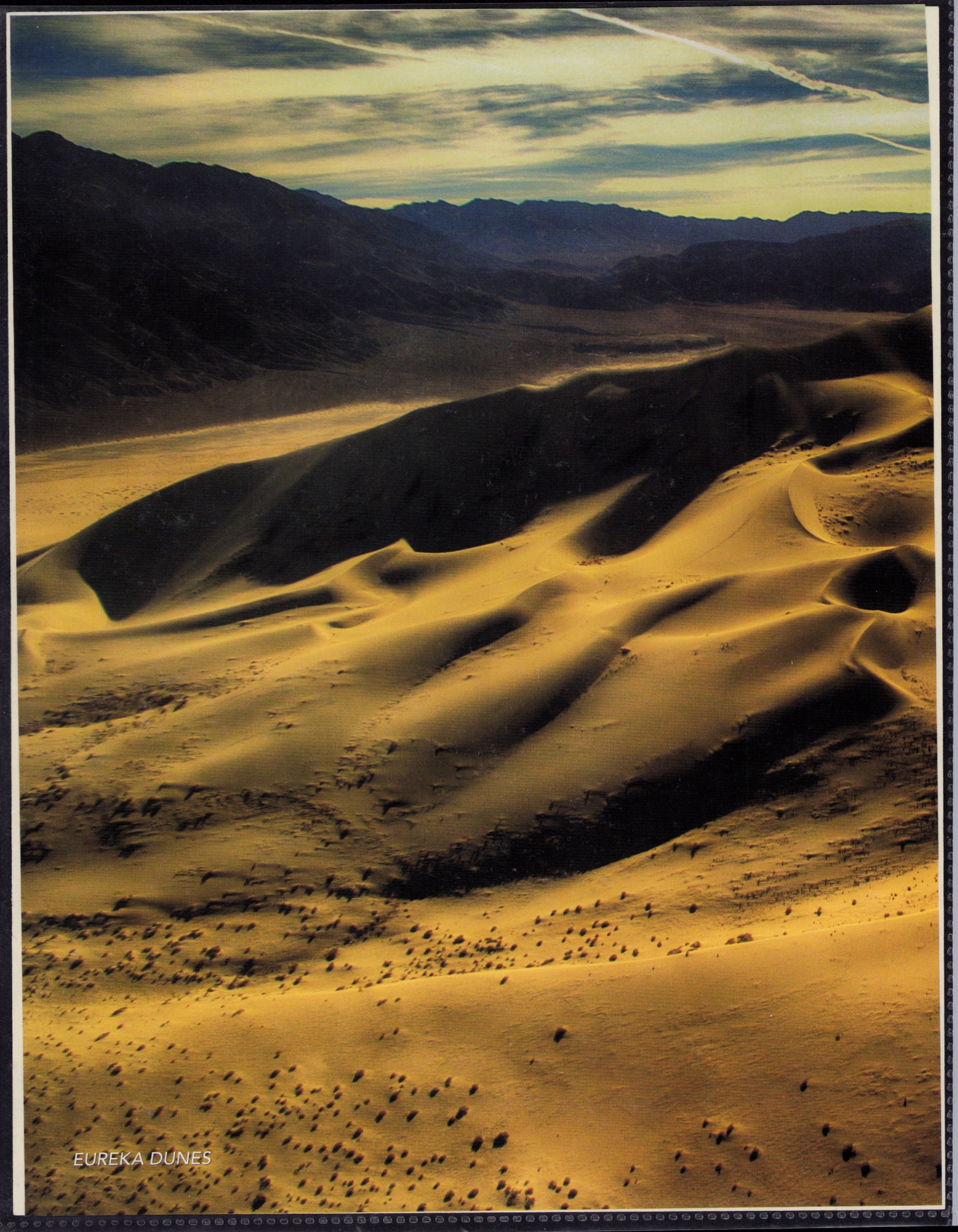
EUREKA DUNE GRASS (Swallenia alexandrae) is often the only plant found on the higher slopes of the dunes. Their dense root system catches and holds drifting sand, forming stable hummocks. Stiff, spiny leaftips protect the plant from being disturbed by herbivores and careless hikers. *Federally listed as an endangered species.*

EUREKA EVENING PRIMROSE (Oenothera avita eurekensis) has large, white, night-blooming flowers to take advantage of pollenators such as moths that avoid the heat of day. When the leafy flower shoot is covered by windblown sand, roots sprout from the sides and a new rosette of leaves forms at the tip. *Federally listed as an endangered species.*

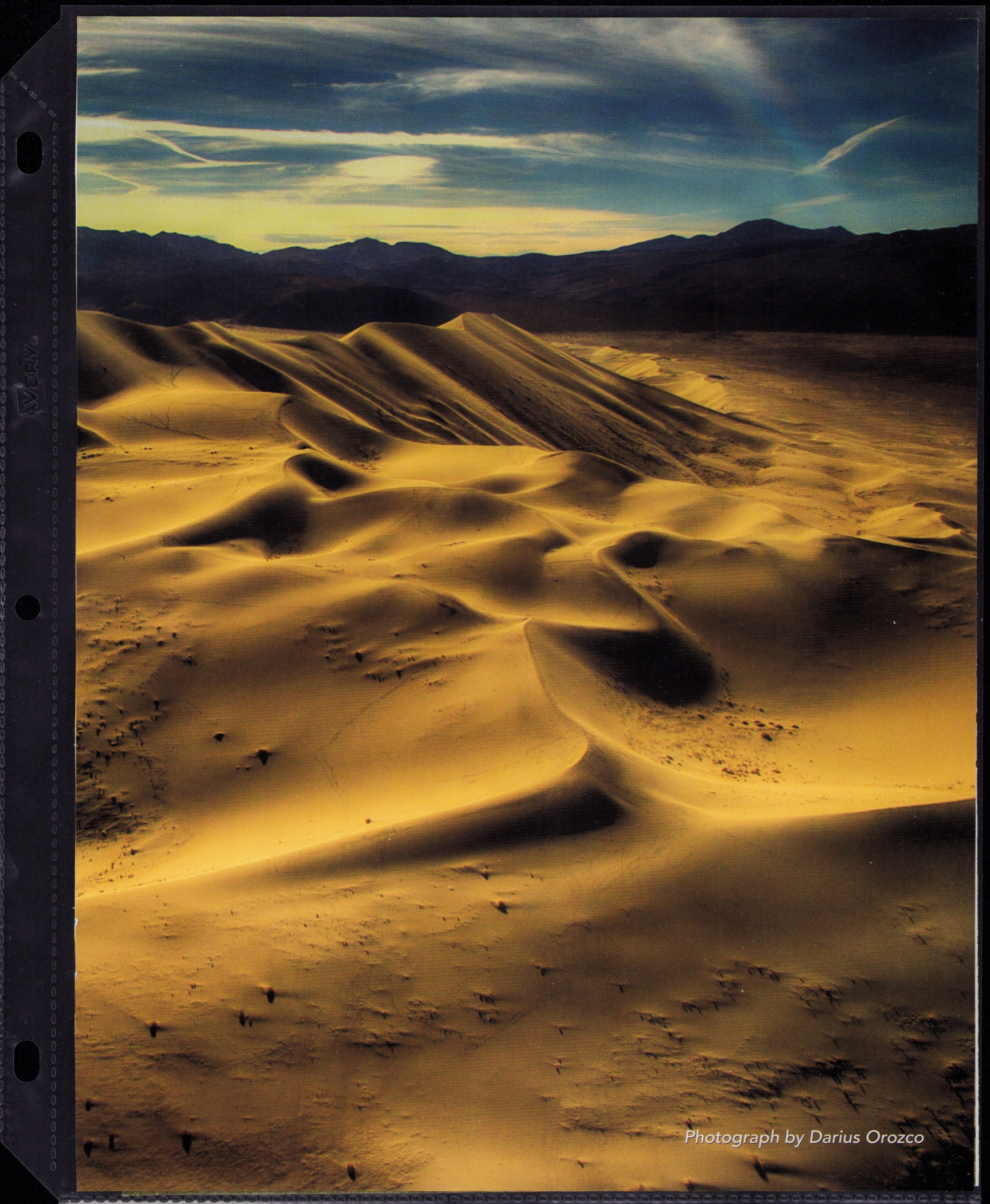
SHINING LOCOWEED (Astragalus lentiginosus micans) reflects excess light and heat with a covering of silvery hairs to conserve moisture. This is a hummock-forming plant like the dune grass. Nodules on the roots gather nitrogen from the air, an important nutrient not available in the sand. *Candidate for the Endangered Species List.*

A SPECIAL PLACE

Eureka Dunes are clearly a special place. Please have respect when you visit. Lifeforms here may not be able to survive our carelessness. Try to choose activities that have the least impact on the land. Camp away from the base of the dunes where most of the endemic plants and animals live. Most importantly, OFF ROAD VEHICLE TRAVEL IS NOT PERMITTED ON THE DUNES, or any where else in Death Valley National Park for that matter. Please keep your vehicle on established roadways.



EUREKA DUNES



Photograph by Darius Orozco

YOU LEAVE YOUR MARK ON THE SAND. AND VICE VERSA.

Part of me thinks I'll never get the sand out of my shoes. Then there's a part that hopes I never do. ha-

-and seeing the sun peak across those dunes, I've never felt more alive in my life.

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Bureau of Land Management

California DESERT CONSERVATION AREA

EUREKA SAND DUNES

Hiking in the Eureka Sand Dunes is a fun, barefoot, toes-in-the-sand experience. Rising nearly 700 feet above the floor of Eureka Valley, these are the highest dunes in California. They are home to several species of rare and endangered plants. The dunes are closed to vehicle use and offer an excellent hiking experience.

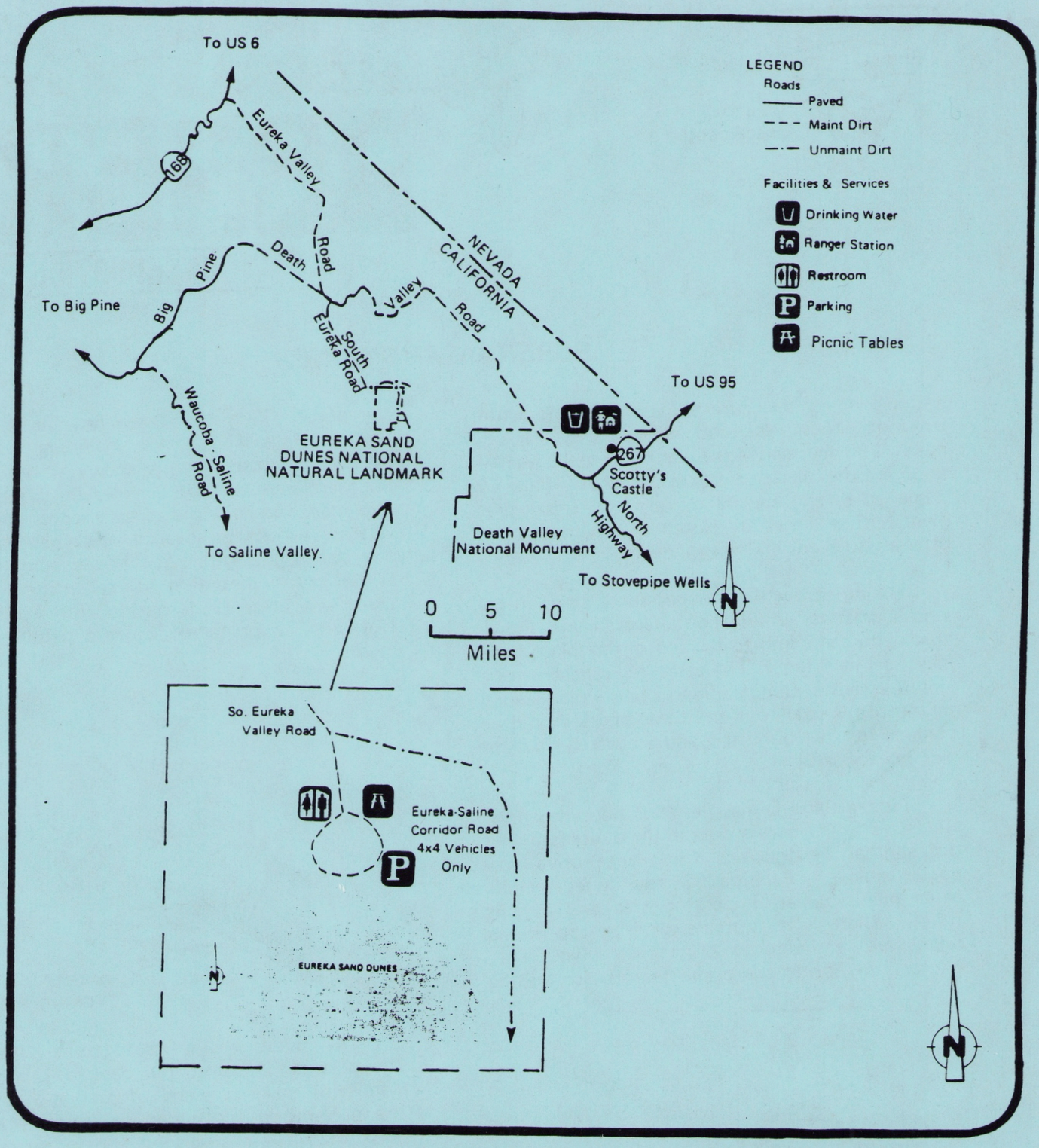
Hiking through the dunes and playing in the sand is great for children of all ages. Hardy individuals who can climb to the top of the tallest dune may hear it "sing". The cascading sand creates a vibrating sound, comparable to a bass viola. Hiking to the top is strenuous and three hours should be planned for the round trip and a canteen of water will be necessary.

Eureka Sand Dunes lies four hours north of Ridgecrest. The access road to the dunes is graded dirt and can be driven in a two-wheel drive passenger vehicle. Facilities at the dunes include three picnic tables, a parking area and a vault toilet. There is no potable water at the site so hikers are reminded to bring their own. Fall, Winter and Spring are prime seasons for visiting the dunes. Summer is too hot for enjoyment. Spring brings wildflowers, including the Eureka evening primrose, a white showy flower found in Southern Eureka Valley. However, spring showers also may wash out the access road so check local weather listings in advance. Fall has warm days and cool nights with a few flowers and little rain. Winter is the driest time of year in the desert and the clear, crisp air is optimal for photography. However, be prepared for cold, often freezing, nights.

EUREKA DUNES
EVENING PRIMROSE

The dunes are a photographer's paradise. The pale sand against the banded Last Chance Mountains make a scene of dramatic contrasts. The patterns of the dunes are enhanced by shadows in the late afternoon and morning hours.

TAKE PRIDE IN AMERICA



FOR MORE INFORMATION:

March 1989

RIDGECREST RESOURCE AREA OFFICE
112 East Dolphin Street
Ridgecrest, CA 93555
(619) 375-7125

CALIFORNIA DESERT INFORMATION CENTER
831 Barstow Road
Barstow, CA 92311
(619) 256-8617

EUREKA VALLEY SAND DUNES and DEATH VALLEY

INYO National Forest

EUREKA VALLEY SAND DUNES

The **Eureka Valley Sand Dunes** are a National Natural Landmark; they rise over 600 feet above the valley floor making them the tallest in California. If you walk on the dunes please do so with care. Delicate plants exist on the sand and are easily destroyed. With careful observation you can see the finely scribed patterns these plants make on the sand during days with light wind. Also note the patterns in the sand made by birds, mammals, and reptiles.

To reach the **Eureka Sand Dunes** go east from Big Pine on State Route 168 for two miles; turn right onto the Death Valley road. The pavement ends after about 25 miles. Look for the often vandalized Eureka Sand Dunes sign at the 35 mile point; turn right again and proceed 9 miles to the sand dunes parking area. THE SAND DUNES ARE CLOSED TO ALL MOTOR VEHICLE USE. Day use and camping are permitted in the area. Facilities include several parking lots, pit toilets, and very basic camping spots. No water is available.

DEATH VALLEY

To reach **Death Valley** continue straight instead of turning right at the Eureka Sand Dunes sign. There is approximately 40 miles of dirt road to Death Valley; one short section of the road is paved through Last Chance Mountains. Continuous paved road begins just inside Death Valley Monument boundaries, before the turn-off to Scotty's Castle. Total distance from Big Pine to pavement in Death Valley is 72 miles and takes about 2 1/2 hours to drive.

SALINE VALLEY

The Saline Valley offers a unique opportunity to visit and explore a very rugged and isolated desert environment. Opportunities abound for hiking, exploring, rock-hounding and camping. Motor vehicle travel is allowed only on approved routes.

Saline Valley is located south east of Big Pine. Take State Route 168 east of Big Pine for approximately two miles; a signed right turn designates the Death Valley road. Drive carefully on this paved, but often pot-holed, road for about 13 miles; look for the signed right turn to Saline Valley Road. The dirt road through Saline Valley continues for 71 miles then you reach pavement again. Another 9 miles takes you to U.S. 190.

DESERT DRIVING

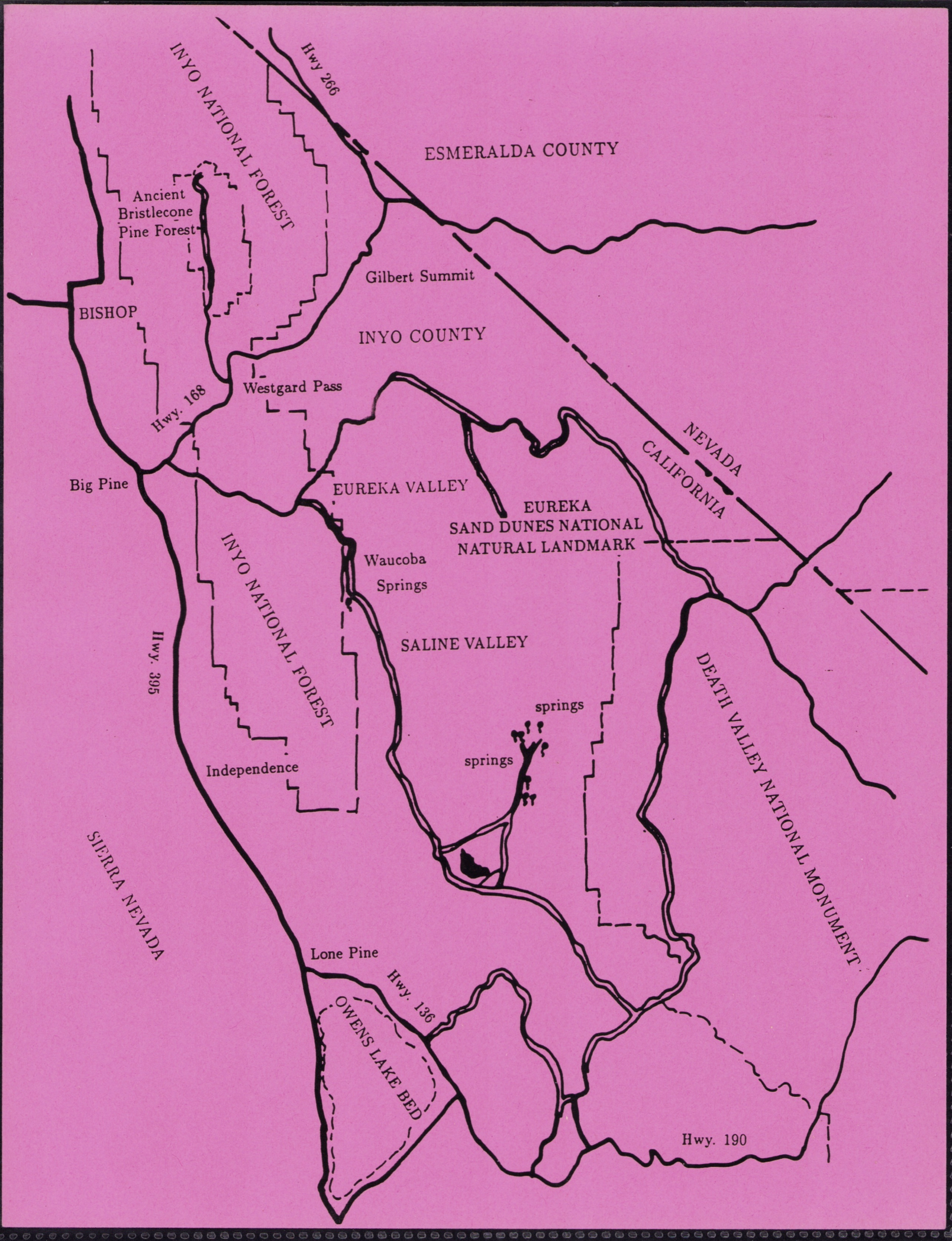
There are no towns, services or telephones in the **Eureka-Saline** area. The area is managed by the U.S. Department of Interior's Bureau of Land Management. The Bureau of Land Management produces a useful map called the **Eureka-Saline** Desert Access Guide.

Travel in this area can be dangerous. Make sure your automobile is in good condition. Check all tires including spare. Also check radiator, hoses, belts, battery, oil and fluid levels. Have a full tank of fuel and **carry plenty of water** and emergency rations. Beware of very high summer temperatures. Also be aware of the danger of flash floods that make roads impassable.

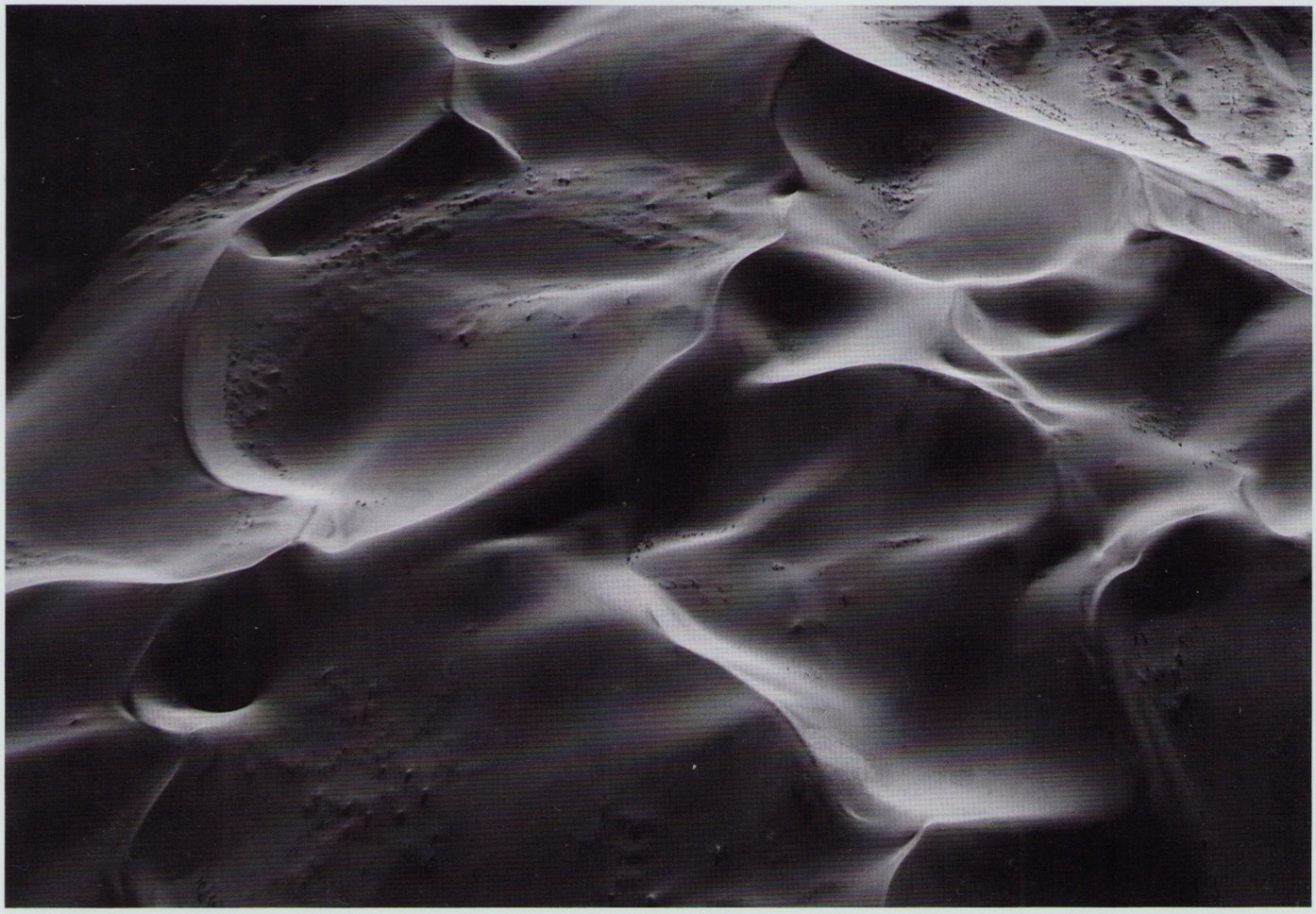
"The policy of the United States department of Agriculture Forest Service prohibits discrimination on the basis of race, color, national origin, age, sex, or disability. Persons believing they have been discriminated against in any Forest Service related activicy should write to: Chief, Forest Service, USDA, Washington, DC 200250."

(12/93)

USDA Forest Service
Inyo National Forest
White Mountain Ranger District


INYO NATIONAL FOREST
Hwy 266
ESMERALDA COUNTY
Ancient
Bristlecone
Pine Forest
Gilbert Summit
BISHOP
INYO COUNTY
Westgard Pass
Hwy. 168
NEVADA
CALIFORNIA
Big Pine
EUREKA VALLEY
EUREKA
SAND DUNES NATIONAL
NATURAL LANDMARK
Waucoba
Springs
INYO NATIONAL FOREST
Hwy. 395
SALINE VALLEY
springs
springs
DEATH VALLEY NATIONAL MONUMENT
Independence
SIERRA NEVADA
Lone Pine
Hwy. 136
OWENS LAKE BED
Hwy. 190

EUREKA SAND DUNES



Death Valley is well known as a land of superlatives. The hottest, the driest, the lowest, the largest...it often seems if one wants to experience extremes, Death Valley is the place to visit.

Located in the northwest corner of the nation's largest national park in the contiguous United States, sits a little known but one of the most interesting of Death Valley's many "mosts".

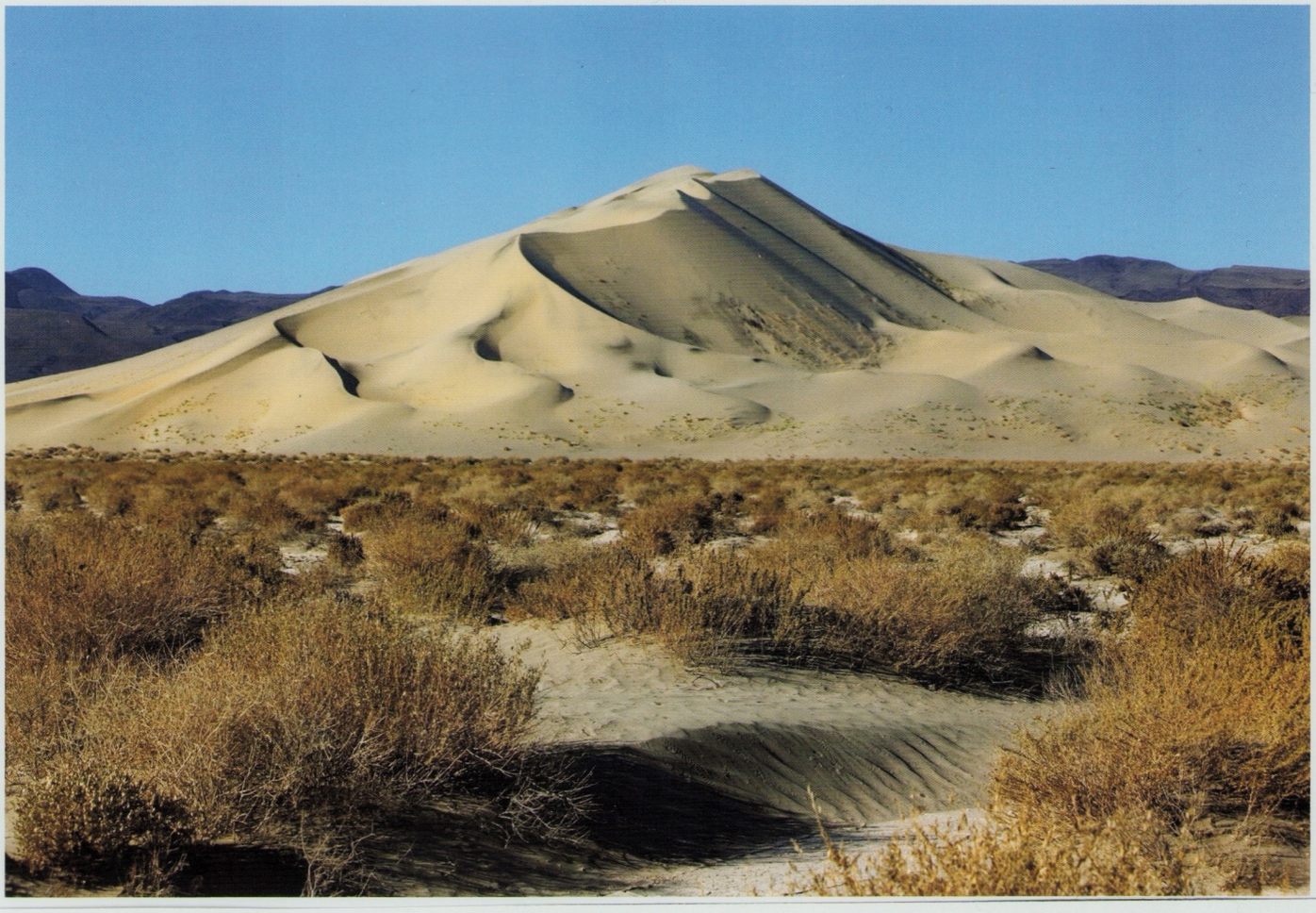
The Eureka Dunes loom grandly over a wild scene of striated peaks, barren defiles and tortured and burnt rubble. In a landscape already unequaled, these dunes bestride starkly over their realm, demanding the heedfulness of all who approach.

At nearly 700 feet high from their base to their top, the Eureka Dunes are the tallest sand dunes in California and among the tallest in the United States, rivaling the Great Sand Dunes of Colorado. The Eureka Dunes spread out for three-square miles along the base of the colorful Last Chance Range.

More rainfall falls on the Eureka Dunes than others in Death Valley due to their location, which captures precipitation from passing winter storms. Plants and animals must survive periods of exposure and coverage by shifting sands to capitalize on moisture stored within these uniquely absorbent dunes.

The Eureka Dunes' remote location has helped bring into existence a number of endemic (found nowhere else) species. These 10,000-year-old dunes are home to five different beetles and three plants that thrive in this difficult environment and found nowhere else in the world.

Geologists consider the Eureka Dunes rare among dune fields in that they are "singing" dunes. When sand avalanches down the steep slopes of



the tallest part of the dunes, one may experience one of nature's strangest phenomena…singing sand. If the sand is very dry, it will emit a low bass note sound, similar to a pipe organ when cascading down. Why the dunes do this is still not fully understood. It is thought perhaps the friction of smooth sand grains sliding past each other creates this mystery of nature.

The Eureka Dunes are not easy to get to. From the Scotty's Castle area, head north on the Big Pine Road and take this mostly dirt road about 45 miles to the dunes. The road is not four-wheel drive (except after heavy rains) but does require high clearance and a lot of patience. An easier way to get to the Eureka Dunes (but much further from Death Valley proper) is from Big Pine, California. From this town the road is mostly paved with all but the final 13 miles on dirt. Allow about 2 hours from either starting point.

The Eureka Dunes became part of Death Valley during its enlargement in 1994. Prior to gaining their protected National Park status, the dunes were often the recipient of off road vehicle enthusiasts testing their skills on the steep and sandy slopes. Some of the endemic plants suffered erosion damage and for a time, their existence was threatened.

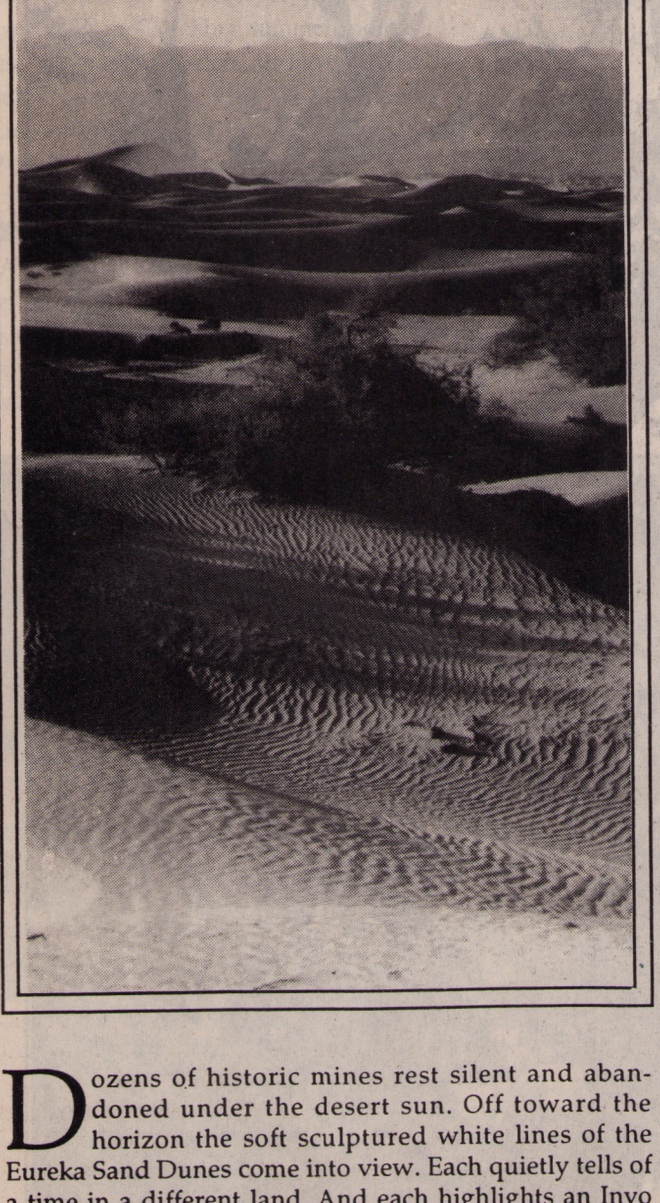
A hike to the tallest dunes is a must. Scout the scene out first and follow the route of least incline. While dune travel is generally safe, preparation is a must. The dunes are fully exposed to sun, heat, wind and reflecting light. Carry extra water, full sun protection and protect cameras, phones and sensitive equipment from the sand. Though it's not a long distance to the top, the going is slow. Keep your bearings on the parking area as you go, and watch the time. Be careful not to tread on any of the plant life on or near the dunes.

There is primitive dry camping at the dunes. As are many features of the desert, perhaps the best way to enjoy the dunes is to spend at least an entire day, having the opportunity to see the dramatic affect that changing light can have as it passes from dawn to dusk.

As with any backcountry travel in Death Valley or in any of the vast deserts of the southwest, check with local authorities for current condition before heading out. The dunes are at 3,000' above sea level, high enough to be quite cold and even receive snow during the winter. Rain can make the road difficult to travel.

Death Valley holds many little known secrets. Visitors are never disappointed when they take the time to discover them. Consider a visit to the Eureka Dunes the next time you're out to discover another one of Death Valley's many quiet gems.

Scenic Byways



Dozens of historic mines rest silent and abandoned under the desert sun. Off toward the horizon the soft sculptured white lines of the Eureka Sand Dunes come into view. Each quietly tells of a time in a different land. And each highlights an Inyo County addition to the National Scenic Byway system.

The 63-mile Owens Valley to Death Valley Back Country Byway and the 84-mile Saline Valley Back Country Byway traverse the high desert region merging with the Great Basin. From these routes some of the region's spectacular desert mountains mingle with geologic wonders and cultural treasures in a land rich in history.

From Saline Valley the steepest mining tram in the United States can be seen rising over 7,000' to the 8,500' crest of the Inyo Mountains. Beginning in the 1800s, the tram at one time carried 20 tons of salt per hour from the purest known deposits. Dozens more of the old mining camps dot the countryside along the byway, but the history goes back further still.

Archeological digs in the region have recovered stone tools dating to 12,000 B.C. Petroglyphs alongside them depict in primitive rock art big horn sheep and abstract images, their meaning remaining a mystery in this quiet land.

The Owens Valley to Death Valley Byway provides an alternative route into the famed national park and a glimpse at another of nature's wonders. The 700' windswept Eureka Sand Dunes, the highest dunes in the Great Basin Desert, can be seen from the road or a short side trip will bring you to the base.

Along the way the road climbs through the mountains harboring more reminders of the mining era. In the 1800s gold, silver, uranium, talc, zinc, lead, and sulphur were mined throughout the region. Remains of the largest sulphur mine in California can be seen from Hanging Rock Canyon in the Last Chance Range.

More information on the byways is available from the Bureau of Land Management which plans to post informational displays and interpretive signs along the route. Maps may be obtained from the BLM's Main Street office in Bishop.

The routes are recommended for high-clearance vehicles due to remoteness, occasional flash flooding or winter snows, and absence of services.

To reach the byways from Bishop take U. S. Highway 395 south to Big Pine turning east on State Route 168. At the junction three miles east of Big Pine take the Death Valley Road. The Saline Valley Road will branch south from the Death Valley Road about 12 miles further and at its end intersects with State Highway 190 southeast of Lone Pine.

BY STEVE SCHMUNK

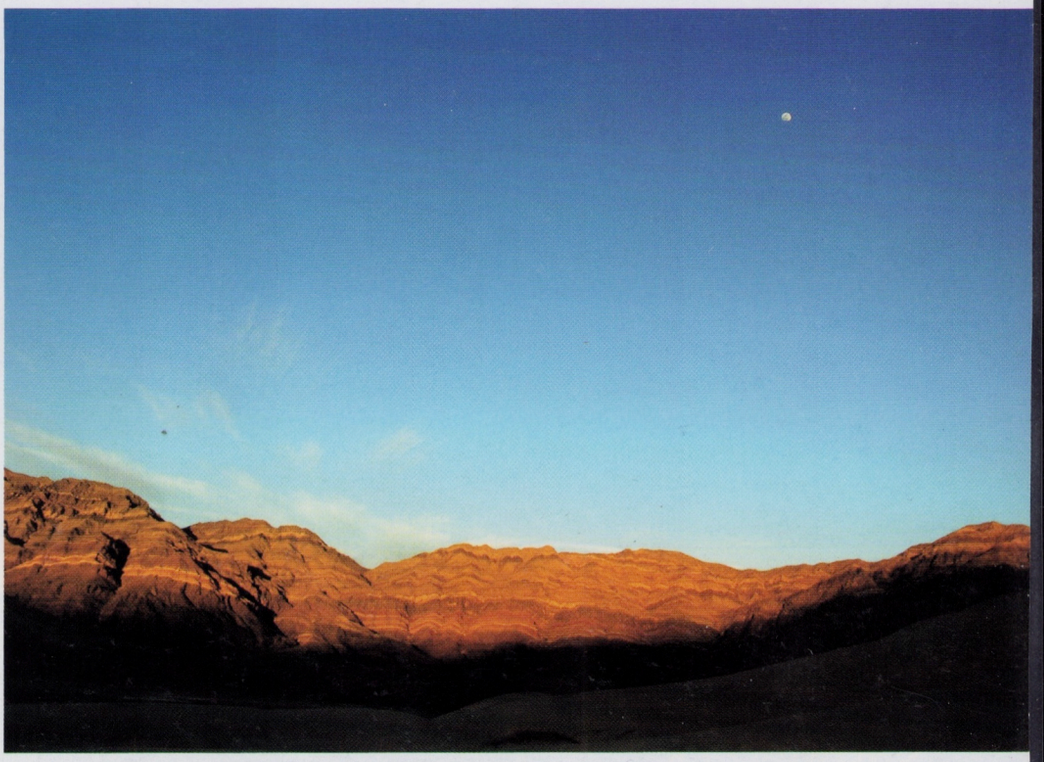
A DAY AT THE EUREKA SAND

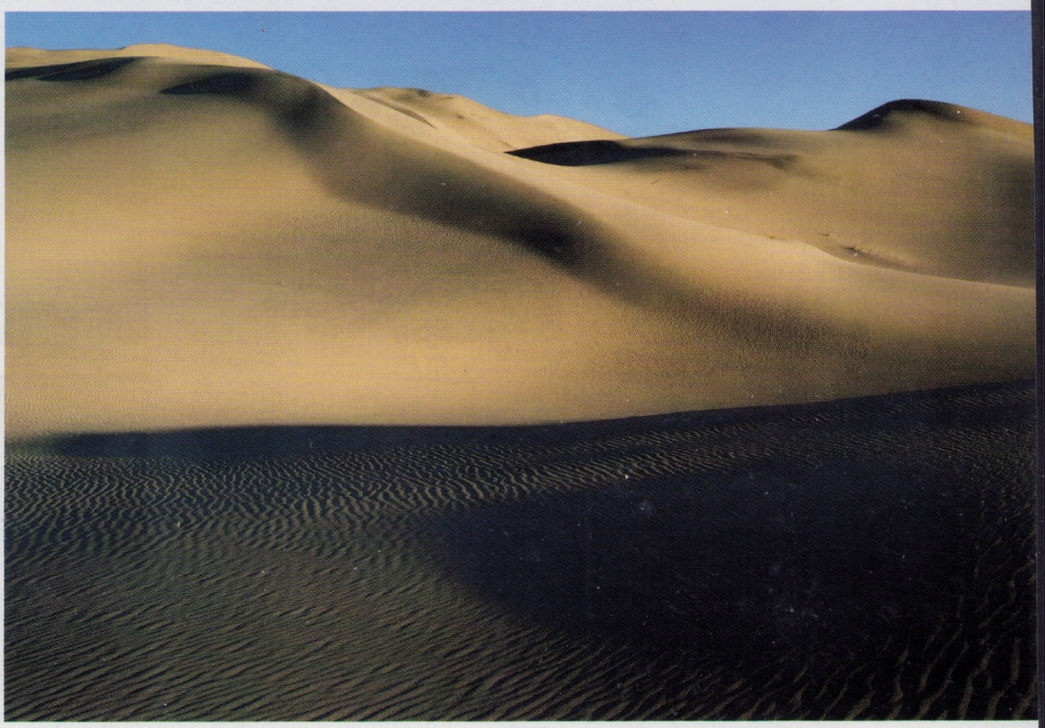
DUNES

Left: The Eureka Dunes are a spectacular destination about an hour's drive east of Big Pine. The last 10 miles of road are dirt but four-wheel-drive is not necessary. While the sparse campsites have picnic tables, there isn't any water. Bring plenty! The best time to visit is between October and April to avoid the scorching temperatures.

Top Right: The Last Chance Range provides a dramatic back drop.

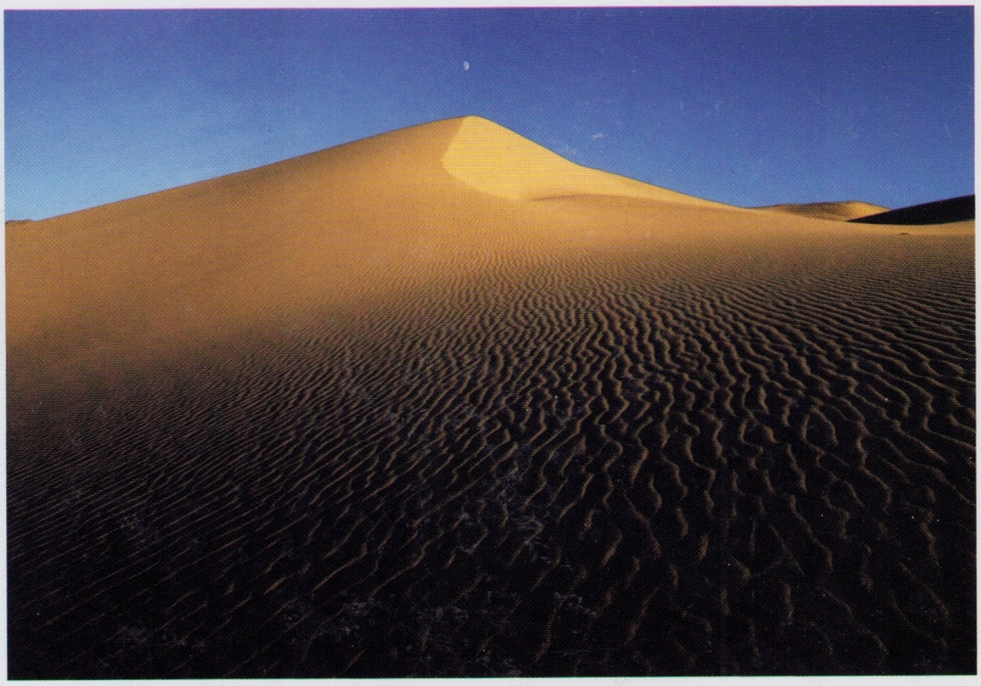
Bottom Right:
The sand reveals endless shapes.





As the sun sets, last light lingers on the sand.

Steve's love of outdoor photography started in 1988 when he visited the Sierra and Yosemite Valley for the first time. Disappointed with his photos, he enrolled in a San Diego junior college to study photography. Over the course of several years he learned black and white, color negative, and color slide printing and experimented with different formats including 35 mm, medium format, and large format 4x5 and 8x10 cameras. Since moving to the Eastern Sierra in 2004 his camera of choice is a Nikon D200 digital slr.



Above the peak of a dune, the moon rises into the sky before nightfall.

Eureka Valley. Photo: Sydney Quinn

Stewardsh

Caring for the Eastern Sierra

spring in the Eureka Dunes.

Get Out!

Exploring Saline Valley

By Todd Vogel

Once, while sitting at the bar of a local diner, my wife and I overheard a longtime resident ask his buddy when he'd moved to the area. "Fifty-seven," he responded. "Aww, you're just a newcomer," the buddy replied. My wife and I glanced at each other. "I guess we know where we stand," I remarked (having lived here a mere ten years). Now twenty plus have gone by since our move, and I feel like I am finally making a tiny bit of headway into exploring the copious public lands within an hour's (or three hours') drive from home, though I am several lifetimes away from getting to all the nooks and crannies. For instance, I've looked at Basin Mountain, in the Sierra out of Bishop, nearly every day of my brief life as a resident of the Owens Valley and yet have never rested on its summit. This causes me some degree of distress as I feel a personal obligation to climb every named peak within sight of my house.

photo: Todd Vogel

Spring colors—and Costa's hummingbirds—brighten the scenery in Saline.

I also would like to visit and explore every named valley in the Inyo region, which is ironic because until my first visit to Saline Valley five years ago, it too was a blank spot on my personal map. For many people, Saline Valley needs no introduction, but for me it was always the place I'll get to "one of these" years. Seen one desert, seen 'em all, I figured. Anyway, I was reminded of this "I'll get to it" way of planning recently at the FOI membership picnic when the subject of Saline Valley came up. One of the participants in the conversation expressed a sentiment much like "I've been meaning to get over there…"

So, consider this an exhortation to get your butt over to Saline Valley if you haven't been there. Lots of desert. Big mountains. Deep canyons. Flowing streams. Waterfalls. Ho-hum: hot springs, too.

Getting there

I've entered Saline Valley via four different routes, each somewhat of a commitment in its own way. By vehicle and not for the faint of heart—Eureka Valley, Dedekera Canyon and Steel Pass make for a fun way to go if you have a true 4WD vehicle and know how to use it on technical terrain. This route ranks a 4 on the 1 – 5 bumpy scale, and you actually drive up small (usually) dry waterfalls. If driving over basketball size rocks is your thing, you might enjoy this route. The other two more typical approaches are either from the north or south end of the Saline Valley road. Plan on the longest 25 miles of dirt you've ever driven. Ease or difficulty of travel just depends on conditions, which are sometimes suitable for sedans, and rarely a goat cart would be a better choice. Finally, using the fourth route, I have arrived on foot after hiking up and over the Inyo Mountains and descending a remote canyon on the north end of the valley. There are many other permutations on this tactic, which I will leave to your own research.

Exploring

Have at it—there's a lifetime of exploration to do. Some suggestions: many roads penetrate the mouths of the canyons on the eastside of the Inyo Mountains (the west side of Saline Valley). These are worthy forays. Start with Hunter Canyon, which has a decent 4WD road to its mouth and a surprise a short way into the canyon. A couple of canyons to the north of Hunter, Beveridge Canyon is worth a jaunt. The road washed out a couple of years ago, so you may have to walk from the main dirt road. Then, continuing north, McElvoy Canyon also has some surprises waiting for you. The only real problem with a visit to Saline Valley is all those other valleys, peaks and canyons you'll see, with names of their own that beg for another visit, another time…

Resources

Books: Much has been written about Saline Valley, and there are several guide books including the recent Michael Digonnet book, *Hiking Western Death Valley National Park: Panamint, Saline, and Eureka Valleys.*.

Maps: First time visitors will want the National Geographic map to Death Valley National Park, as well as the individual topo maps to any areas you intend to visit.

A Google search for any of these keywords will reward the searcher: "saline valley hot springs, mcelvoy beveridge canyon, steele pass."

A brilliant sunset ends another day of adventure in the Inyos.

photo: Todd Vogel

NPS putting together plan for Saline Valley

Public given more time to comment on planning process

6-21-2012

By Mike Gervais
Register Staff

Officials with the National Park Service have extended the scoping period for public input to help inform the development of a management plan and Environmental Impact Statement for the Saline Valley Warm Springs area of Death Valley National Park.

Comments for this phase of the planning process will now be accepted until Aug. 6, 2012.

"Public input is very important to this planning process, and the NPS is extending the comment period to allow for all members of the interested public to share their perspectives and suggestions," a press release from the National Park Service states.

Comments may be submitted online at the NPS Planning, Environment and Public Comment website: http://parkplanning.nps.

See SALINE, page 5

SALINE

Continued from front page

gov/SalineValleyScoping.

Those who do not have Internet access may direct comments regarding this project to the park in writing by mail or hand delivery to: Death Valley National Park Attention Saline Valley Management Plan, P.O. Box 579, Death Valley, CA 92328.

Comments may also be e-mailed to DEVA_planning@nps.gov.

The purpose of the proposed plan is to provide a framework for management of the popular, remote area of the park by "balancing the protection of unique natural and cultural resources with public health and visitor use at the Saline Valley Warm Springs," the press release states.

The NPS recently hosted three open house-style public meetings in communities near Saline Valley (Bishop, Victorville and Ridgecrest) to present the objectives of the plan and its EIS, and provide opportunity for attendees to comment in order to identify environmental impacts, issues and concerns for the planning process.

The information that was gathered at the meetings will help planners advance to the next stage of the process, the development of draft plan/EIS, which will include a range of management alternatives, each including different options or combinations of options for management of the area.

National Park Service Environmental Project Specialist Mike Cipra said all three meetings were well attended and provided a wealth of information to plan organizers.

"Folks brought up a variety of issues and concerns," Cipra said. "A lot of people feel passionately about the Saline Valley, and they wanted us to know they want to maintain the recreational uses, the historic uses that have been going on out there. We received that message and feel likewise."

Cipra said that no official plan for the area will be adopted until at least 2015, and "we don't have any pre-conceptions about what the plan is going to look like, that will be fleshed out through this process, which is why it is crucial that people participate."

Cipra explained that the NPS developed a general management plan for Death Valley back in 2002, but wanted to create an individual plan to ensure that those who are passionate about the area will have an opportunity to be heard and have a hand in shaping the plan.

The NPS generally includes names and addresses of respondents who provide that information or comments on its actions, and makes them available for public review following the conclusion of the environmental assessment process.

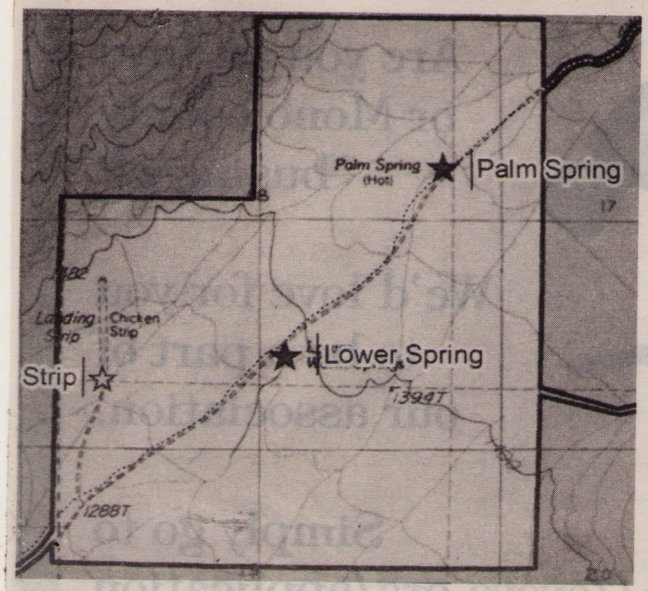
Individuals who comment on the plan may request that the NPS withhold their name and/or address from public disclosure by saying so at the beginning of their comment.

Commentators using the website can make such a request by checking the box "keep my contact information private."

"NPS will honor such requests to the extent allowable by law, but you should be aware that NPS may still be required to disclose your name and address pursuant to the Freedom of Information Act," a press release states. "We will make all submissions from organizations, businesses and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety."

NPS considering a plan for Saline Valley Warm Springs

6-21-2012



By Christina Reed, The Hired Pen

Saline Valley, CA--The National Park Service (NPS) is taking comments until August 6, 2012 on a proposed plan for managing the resources at Saline Valley Warm Springs. The open house meeting in Bishop last week featured NPS staff, easel-type info boards, and plenty of folks asking about the proposal. The NPS open house was also presented in Ridgecrest and Victorville.

The NPS is requesting comments online at: http://parkplanning.nps.gov/SalineValleyScoping. Or email comments to: DEVA_Planning@nps.gov; or mail written comments to: ATTN Saline Valley Management Plan, Superintendent, Death Valley National Park, PO Box 579, Death Valley, CA 92328.

A number of concerns have generated the need for a management plan and the Environmental Impact Statement (EIS), says the NPS. These concerns include: "protections actions," addressing "sanitation and safety concerns," understanding "the visitor experience," directing "resource management," and responding "to changing conditions as a result of increased visitation."

The NPS will consider visitor activities, camping, the Chicken Strip airstrip, management of wild burros, and types of recreational uses in its formation of the EIS.--CAR

The National Park Service is developing a plan to create a framework for administration and management of the Saline Valley Hot Springs and is soliciting input from the remote region's users. Photo courtesy wikipedia.com

Public Comments Sought on Saline Valley Warm Springs Plan

Plan to be developed for natural and cultural resources management

Register Staff 5-5-2018

Death Valley National Park invites the public to provide input into a proposed draft management plan for Saline Valley Warm Springs. Comments are due by July 2.

Saline Valley Warm Springs are located in a remote northwest corner of the park, 35 miles from the closest paved road. The springs range from 61 to 117 ˚F. A history of counter-culture use from the 1950s through 70s resulted in developed soaking pools and art installations.

The draft Saline Valley Warm Springs Management Plan and Environmental Impact Statement (EIS) is intended to provide a framework at the Saline Valley Warm Springs area for natural and cultural resources management, administration and operations, and managing visitor use.

The preferred alternative in the draft plan proposes actions including:

Fencing would be installed around the developed area to exclude burros.

Officially designating the Chicken Strip airstrip as a landing strip through an associated rulemaking process, allowing it to remain open. Camping would be allowed at the airstrip.

Camping permits would be required. Permits would be free at first, but a fee might be implemented later. Camping would continue to be limited to 30 days per calendar year. Dispersed camping will be allowed in designated areas.

One of the developed soaking pools at Saline Valley Warm Springs..

NPS photo

Remove non-native vegetation (including palms) from the Upper Springs. No replacement palms would be placed at Lower Springs when existing ones die naturally.

Art that is found to be 50 years or older is considered eligible for the National Register. Art installations determined to be eligible would be managed in accordance with the National Historic Preservation Act. Non-historic art would be removed regularly to preserve the natural beauty of the area.

The document is available and comments may be submitted online at http://parkplanning.nps.gov/SalineValleyWarmSprings. Comments may be submitted by mail to: Death Valley National Park, P.O. Box 579, Death Valley, CA 92328. A limited number of paper copies are available at park headquarters as well as public libraries in Amargosa, Pahrump, Bishop, Lone Pine, and Ridgecrest.

Death Valley National Park

See PLAN ▶ Page 3

The bat pole greets visitors on their way to Saline Valley Warm Springs.

NPS photo

PLAN

Continued from front page

will host public meetings:

· Sunday, May 27, from 1 - 2 p.m. at the Saline Valley Warm Springs.

· Tuesday, May 29, from 5:30 -7:30 p.m. at the Ridgecrest Historical Society, 230 West Ridgecrest Blvd., Ridgecrest, CA 93555.

· Wednesday, May 30, from 5:30 - 7:30 p.m. at the Inyo Council for the Arts, 137 South Main St., Bishop, CA 93514.

· Thursday May 31, at 5:30 - 6:30 p.m. online via a webinar. People joining the web presentation should register at https://parkplanning.nps.gov/SalineValleyWarmSprings for the webinar link and call-in phone number no later than 15 minutes before the presentation begins.

"Saline Valley Warm Springs area is unique enough to need its own specific plan," explained Death Valley National Park Superintendent Mike Reynolds. "The location is isolated, there are a variety of complex resource issues, and there are communities of passionate users."

The Bureau of Land Management, Inyo County, and Timbisha Shoshone Tribe are cooperating agencies and provided input on the draft plan.

The Timbisha Shoshone Tribe considers the waters to be as source of puha, a life force energy. The preferred alternative includes increased cooperation between NPS and the Tribe, in line with the Timbisha Shoshone Homeland Act of 2000.

The Timbisha Shoshone Tribal Historic Preservation Officer, Barbara Durham, has expressed "support of the protection of the intangible and symbolic values of the Timbisha Shoshone that are extant throughout Saline Valley."

"The Bureau of Land Management, Ridgecrest Field Office, fully supports Death Valley National Park and their efforts to provide the public with a sound management plan for the critical resources in the Saline Valley Warm Springs area," said Caroline Woods, acting assistant field manager.

Cathreen Richards of the Inyo County Planning Department encouraged the NPS "to preserve Saline Valley Warm Springs as an important site to the history and culture of Inyo County."

5-19-2018

PHOTO COURTESY DEATH VALLEY NAT'L PARK:

The Times They Are A-Changin' at Saline Valley Hot Springs. See story page 5.

Saline Valley Warm Springs update planned

National Park Service to hold public meeting Nov. 17

Register Staff 11-7-2019

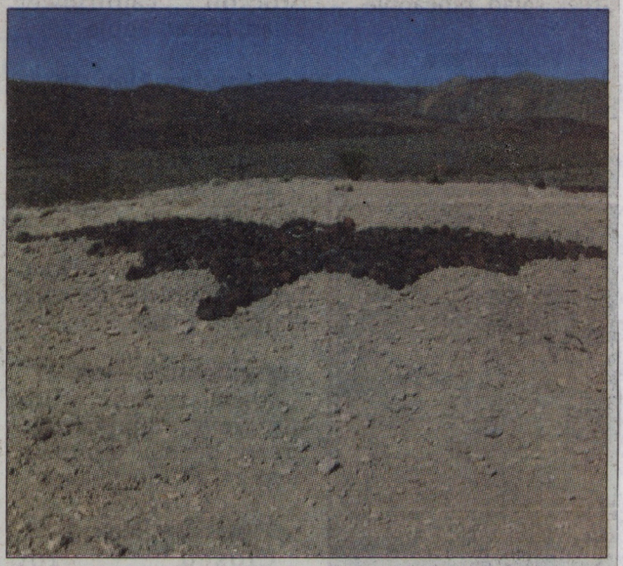
National Park Service (NPS) staff will host a public meeting on Nov. 17 at 1 p.m. to give an update about and discuss timelines for the recently completed Saline Valley Warm Springs Final Management Plan and Environmental Impact Statement.

Saline Valley Warm Springs are located in a remote northwest corner of Death Valley National Park, 35 miles from the closest paved road. Recreational users developed soaking tubs and art installations starting in the 1950s. The site was managed by the Bureau of Land Management (BLM) until it was transferred to NPS by the California Desert Protection Act in 1994.

The NPS started working on a management plan for the site in 2012. Inyo County, the BLM, and the Timbisha Shoshone Tribe participated in the plan as cooperating agencies. Several organizations were heavily involved in providing comments, including the Saline Preservation Association and Recreation Aviation Foundation.

There were opportunities for the public to provide feedback on the plan's direction in 2012,

See SALINE VALLEY ▶ Page 3



This bat design is an example of artwork that has been created near the Warm Springs. Non-historic artwork that is not located in wilderness will remain but no new permanent installations will be allowed.

Photo courtesy of the National Park Service

Continued from front page

2014, and 2018. The NPS hosted 12 public meetings and received a total of 1,696 pieces of correspondence during these comment periods. The NPS made changes to the plan at every stage of the process reflecting the feedback received from the public, organizations, and agencies.

"Saline Valley is a very special part of Death Valley National Park and this unique area is enjoyed by visitors from around the world," said Death Valley National Park Superintendent Mike Reynolds. "We look forward to meeting with the public to celebrate the completion of this planning effort and to begin implementing the plan by working with partner groups and the public."

Staying the same under the plan

· Existing soaking tubs at Lower Spring and Palm Spring will remain in use and maintain their historic form into the future.

· Upper Spring will remain undeveloped as it returns to its natural condition.

· All art installations that were in place by Jan. 1, 2019, in non-wilderness areas will stay in place.

· Airplane use of the Chicken Strip, in use for decades, is authorized by a separate special regulation.

· NPS established memorandums of understanding (MOUs) with user groups for maintenance and management of Saline Valley Warm Springs.

· Public nudity is common at the site, and the plan is silent on this topic. Public nudity is not against federal regulations, but lewd behavior is.

Some changes from the plan are already implemented while others will require future funding:

· Three camping zones will be established: 1) car camping areas; 2) walk-in camping with an associated parking area separate from the camping area; and 3) areas where camping is prohibited, including within 100 feet of source springs.

· Artistic fencing will be added around source springs to prevent access by nonnative burros.

· Existing mature palm trees will stay at Lower Spring and Palm Spring. As the palm trees age and die, they will be replaced with native vegetation to provide shade and maintain the oasis feel of the spring.

· The upper spring will be restored to its natural condition including removal of all nonnative plants, including palm trees.

· New artwork will be allowed only if it does not disturb natural or cultural resources, is temporary and is removed by visitors when they leave.

· The auto shop will be removed and associated hazardous materials will be cleaned up and removed.

· The NPS will address concerns about water quality, storage of hazardous materials, and wastewater.

The public meeting will be held at Saline Valley Warm Springs on Nov. 17 at 1 p.m. Those intending to attend the public event must carefully prepare for the trip, which is several hours from the nearest paved road. High-clearance vehicles with all-terrain tires are recommended and those coming must bring all of their own supplies.

LOCAL NEWS

NAKED AND AFRAID (OF BUREAUCRATS)

By Bodine

Saline Valley Hot Springs is a remote destination in a remote part of the world, a speck on a map. That's what most visitors have come to expect (and appreciate) and why they travel such a great distance through inhospitable territory to get naked and play in the Springs' therapeutic waters.

The hippie paradise has historically been autonomous and self-policed - even before it became absorbed by Death Valley National Park during the park's expansion in 1994.

A management plan (released May 4) for the hot springs and dispersed camping was inevitable now that it's part of the park, and no matter what the plan says, it's pretty clear locals and Saline diehards will be against it.

When asked why the plan was coming out now, "Oregon" John Runkle, President of the Saline Preservation Association said it's the glacial pace of the federal government. Since the park expansion, a plan was forthcoming, it's just taken awhile.

He described parts of the plan as "government at its best." One part of the plan calls for a five-foot tall fence to be installed around the entire 184 acres of developed areas to keep the wild burros out of those areas. However, the plan also calls for the relocation of those same burros.

Lawns will be torn out from what Runkle calls an "oasis" for no particular reason. One of the most impactful parts of the plan will be the elimination of the camp host's makeshift mechanic and tire repair shop run by "Lizard" Lee Greenwood. Runkle said there is not another tire repair or towing outfit for hours in any direction. Saline Valley Road is comprised of more than 80 miles of washboard dirt road.

Greenwood and others are credited with building the hot springs into concrete tubs and turning the spot into a destination.

The 350-page management plan would include the fencing for the burros; the airstrip known as the Chicken Strip will be officially designated and remain open; camping permits will be required and will be free, for now, and limited to 30 days and will be at least 200-feet from tubs; non-native vegetation including the palm trees from the Upper Springs, will be removed and no replacement trees will go in when the current trees die; art that is more than 50 years old will be eligible for consideration through the National Registry and will remain, but non-historic art will be removed and any new installations will be removed. The bat pole will remain. Tubs will have to accommodate those with disabilities but there are no details as to what that will entail. All user-created fire rings will be removed.

According to a press release from Death Valley National Park, the hot springs are considered sacred by the Timbisha Shoshone Tribe. The plan calls for increased cooperation with the tribe and the park in addressing issues at the springs.

The document is available and comments may be submitted online at http://parkplanning.nps.gov/SalineValleyWarmSprings. Comments may be submitted by mail to: Death Valley National Park, P.O. Box 579, Death Valley, CA 92328. Comments will be accepted until July 2.

A limited number of paper copies are available at park headquarters as well as public libraries in Amargosa, Pahrump, Bishop, Lone Pine, and Ridgecrest.

There will be public meetings throughout the area including , Sunday, May 27, from 1-2 p.m. at the Saline Valley Warm Springs; Tuesday, May 29, from 5:30-7:30 p.m at the Ridgecrest Historical Society, 230 West Ridgecrest Blvd, Ridgecrest; Wednesday, May 30, from 5:30-7:30 p.m. at the Inyo Council for the Arts, 137 South Main St, Bishop; and, Thursday May 31 from 5:30-6:30 p.m. online via a webinar. People joining the web presentation should register at https://parkplanning.nps.gov/SalineValleyWarmSprings for the webinar link and call-in phone number no later than 15 minutes before the presentation begins.

The Saline Preservation Association is rallying its troops asking members to read the entire 350-page plan, learn and memorize the acronyms and language and come to meetings prepared to present a defined and clear message.

Runkle said the Association will publish an official response and position on the plan later in the week.

Representatives from the Timbisha Shoshone Tribe or Death Valley National Park did not return calls for comment from The Sheet.

Donkey rescue group to relocate burros from Death Valley

5-24-2018

Animals to be relocated to off-site adoption facilities and sanctuaries

Register Staff

Burros from Death Valley National Park will soon be moving to new homes. The National Park Service has entered into a five-year agreement with the Texas-based nonprofit Peaceful Valley Donkey Rescue to capture 2,500 burros from Death Valley National Park and relocate them to offsite adoption facilities and sanctuaries.

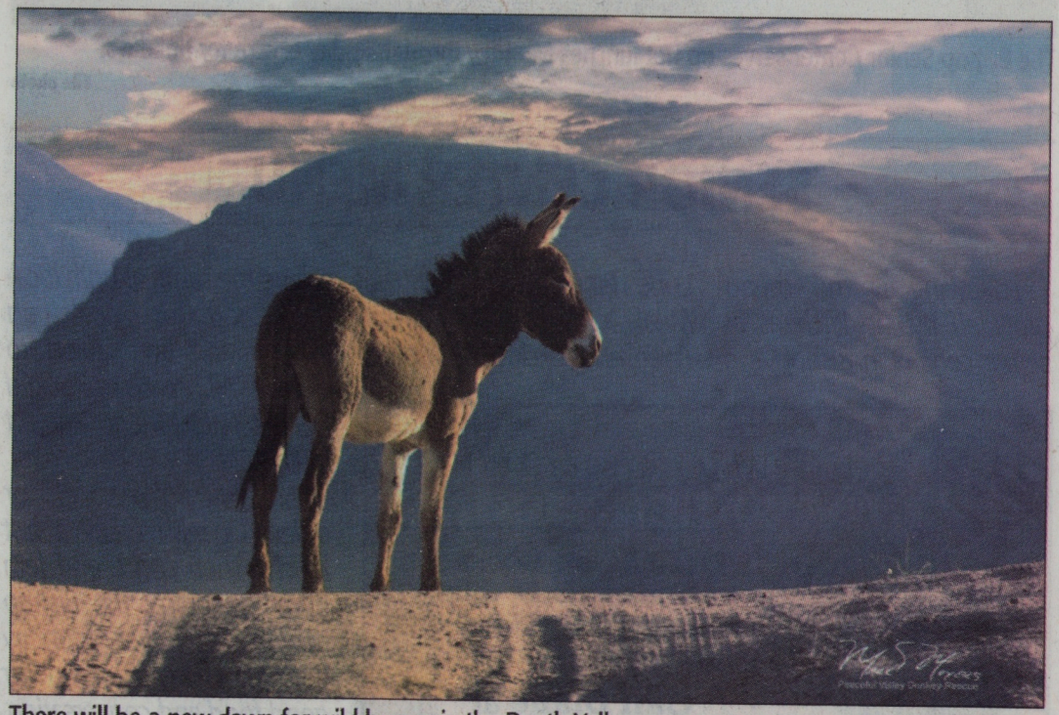
"Burros are not part of the natural California desert ecosystem," said Mike Reynolds, superintendent of Death Valley National Park. "They damage springs and vegetation. They compete for food and water with native animals, such as desert bighorn sheep. In addition, they are a safety hazard to visitors on park roadways. With this partnership, we have created a win-win situation for the burros, the park, and taxpayers."

Relocations will be done through a public-private partnership with minimal cost to the government. Peaceful Valley's burro project at Death Valley National Park is entirely funded by private donations, foundation grants, and corporate sponsorships.

Mark Meyers, executive director of Peaceful Valley Donkey Rescue, said, "Our main objective is to protect our wild burros. If they must be removed, we want to ensure that it is done safely with as little stress possible."

Peaceful Valley will use humane methods to capture burros. One method is to bait burros into a temporary pen with water or food. Wranglers on horseback may also drive the animals into temporary corrals.

Peaceful Valley will transport burros to temporary holding facilities before transferring them to a training facility. Trainers will work to prepare the burros for adoption.



There will be a new dawn for wild burros in the Death Valley area.

Photo by Mark Meyers

Park Service officials expect the relocation effort to begin in late May.

Wild burros are present in many areas of the Mojave Desert. Peaceful Valley Donkey Rescue also has plans to relocate burros from Fort Irwin National Training Center and Mojave National Preserve.

MIKE GERVAIS *Publisher* | TERRANCE VESTAL *Managing Editor*

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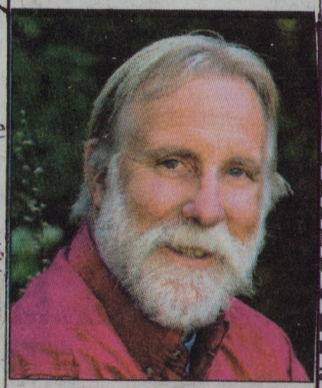
Uncommon Sense

Muddy waters in Saline Valley



CARNE LOWGREN
COLUMNIST

There is a process that happens when a big chunk of remote and mostly empty land is set aside as a national park. At first the new park only exists as a place on a map- the land itself and whatever goes on on it is largely unaffected. It doesn't immediately turn into a big outdoor Disneyland like Yosemite Valley of the South Rim of the Grand Canyon. How long this process takes depends on how big, remote, and popular the park becomes.

Death Valley National Monument was upgraded t national park status back i 1994, and is going through its version of that process now. Most of it has always been de facto wilderness, with a handful of paved roads and a sparse networ of mostly dirt roads linking popular, semi-popular and largely unknown destinations.

The land the park's boundaries enshrine is not particularly distinguishable from the Eastern California/Western Nevada basin and range country the park is carved out of. But there is a lot of it, and now it is a national park, administered by the National Park Service with a various set of mandates regarding everything from where you can drive, ride, or camp; what you can and cannot do there, and both natural and cultural preservation.

The upgrade and expansion of DV brought Saline Valley into the park, and now the NPS is finally trying to figure out what it is going to do about managing the hot springs thence the public meetings in the area seeking input on this matter. As a lifetime desert rat and longtime Saliner I have been happy with how the hot springs have not been managed up until now. Official benign neglect has served it well.

The hot springs are clean, nice, beautiful and user-friendly, and lack the gen ic industrial tourism vibe that generally results fro intensive hands on park service management. But change was probably inev table, even if it may not b for the better.

Saline Valley Warm Springs presents an interesting and unique challen to a Park Service whose mandate is to manage it in the public's interest. It is the nature of its job that the NPS must do something, whether it actually needs doing or not. In the past several decades the reigning paradigm of the NPS has gone from building tourist attractions and entertaining tourists, to the preservation and enhancement of natural and, when applicable cultural values. Saline Valley's hot springs do not fit comfortably within its mandate. As anyone who has been there knows, the hot springs is a culture and community as much as a place. The springs are well developed in its ad hoc, as opposed to commercial way, and is not "natural" in the sense of some remote High Sierra valley days from the trailhead.

It is a fine and fuzzy line that distinguishes lifestyle from culture, and Saline Valley Warm Springs straddles that line in a funny place. The hot springs as it now is and has been for decades is both a result of and a monument to the 60s counterculture in both its aesthetic and values. Since Hippie is a current lifestyle option, it is difficult to see it as a unique culture worth preserving.

Whether or not to preserve the Saline Valley Warm Springs as a cultural place is a particularly hard question to ask of an agency whose self-perceived mandate is to make its attractions user friendly to the most people, while preserving or restoring all the rest of the lands it manages in their natural – as in pre-arrival of the white man-state. It isn't as if the hot springs isn't friendly – in the nature of hard to get to places its self-selected community is one of the friendliest ones I get to be part of. Everyone is welcome, but welcome on the hot spring's own terms- which will very likely be different than those any kind of top down public management would impose on it.

Save for perhaps eliminating the non-endemic burros, which the NPS plans on doing down the line anyway, I'd hate to see the hot springs "improved" in order to bring it in line with either the convenience and comfort of the generic American tourist, or the past, current and future land management mandates of a public agency. Saline Valley Warm Springs is worth preserving as is- one of the last remaining places in an increasingly regulated and homogenized world where the Old West and the 60s counterculture's shared values of self-management, freedom and free expression live.

(Over the decades Carne has been a sporadic to frequent Saliner.)

MIKE GERVAIS *Publisher* | TERRANCE VESTAL *Managing Editor*

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It is more than the waters that are muddy

By Vernon C. Bleich

It was with great interest that I read Carne Lowgren's column titled, "Muddy waters in Saline Valley" that was published in *The Inyo Register* on May 29, 2018. Although there have been very, very few opinion pieces written by Mr. Lowgren with which I would agree, he caught my attention with that article and his opinions have my strongest support. I am a retired employee of the California Department of Fish and Game (CDFG) and a former, longtime resident of Bishop, and I am very familiar with the issues raised by Mr. Lowgren as they relate to the perceived mission of the National Park Service (NPS). Moreover, I am very familiar with Saline Valley and the warm springs that are the subject of his commentary, and first visited that desolate area in 1973 as a newly hired employee of the department; those visits continued throughout my career.

Mr. Lowgren describes the mandate of the NPS as, "... to manage ... in the public's interest" and then follows that phrase with the thought that NPS "must do something, whether it actually needs doing or not." I certainly subscribe to that concern; the hot springs and hot springs culture have existed for many decades, and both fared well under the authority of the Bureau of Land Management (BLM). During none of my trips to that isolated part of California did I ever encounter a problem involving other persons, although vehicle breakdowns were another story. In 1957 CDFG Wildlife Biologist Dick Weaver, who until his recent passing was likely the best-known bighorn sheep biologist in North America, described Saline Valley as, "... being so remote that even beer cans are scarce." Even in 1973, during my initial trip into that area, feral donkeys were abundant, but people were few. Little seems to have changed in the past 60 years - until now.

Interestingly, NPS spokeswoman Abby Wines has emphasized that some sort of official guidance for Saline Valley is "long overdue" and that the issue was ignored in the Death Valley National Park (DVNP) general management plan (2002), and in the DVNP "wilderness and backcountry stewardship plan" (2012) because park officials were reluctant to deal with it. As an individual that spent an entire professional career working to conserve desert wildlife, I find the irony of that statement to be profound, given that implementation of the DVNP "stewardship plan" resulted in the recent removal of three water sources developed specifically to help conserve bighorn sheep. One, in fact, was developed ca. 1970 in a cooperative effort with Death Valley National Monument staff, and two others were developed in cooperation with Bureau of Land Management (BLM) personnel on public lands prior to being transferred to the National Park Service following the California Desert Protection Act (CDPA) of 1994. Similar proposals have been put forth by the National Park Service at Mojave National Preserve, an area formerly managed by the Bureau of Land Management, and are adamantly opposed by conservationists across North America. Indeed, doing something, whether needed or not, appears to be a widespread and pervasive desire.

I suspect that overzealous enthusiasm resulted in California Senator Feinstein's failure to foresee the many ramifications of her legislation - the CDPA - and its onerous implications for wildlife and, in the case of the Saline Valley warm springs, humans. As noted by the late conservationist and former Chief of the U.S. Forest Service Jack Ward Thomas, "Taken one at a time, it is difficult to argue against ... environmental laws. Taken in interactive total, they have produced a worsening impasse in federal land management - an impasse that Congress created with the best of intentions. It is an impasse that only Congress, with the best of intentions, can remedy." If ever there were a time to remedy such situations, it is now.

I sincerely hope that those with an appreciation for the history, novelty and remoteness of Saline Valley and the warm springs are more successful in advocating for their causes than were the individuals and organizations that expressed concern and dismay about the potential impacts of the backcountry wilderness and stewardship plan on the well-being and conservation of bighorn sheep, and then watched helplessly as the aforementioned water sources were removed. Good luck in your advocacy for maintaining the status quo in Saline Valley, but please emphasize the need to eliminate the donkeys - a task that DVNP has not pursued adequately.

Politically, Carne, I suspect you and Secretary of the Interior Ryan Zinke, do not have much in common. I suggest, however, that voicing the concerns that you and others have to the highest levels of the Department of the Interior will have a far greater effect on the future "management" of the Saline Valley warm springs than will letters addressed to local bureaucrats, where the muddiest of ideas often originate.

(Vernon C. Bleich currently lives in Bismarck, North Dakota.)

Dexhimer Giuliani
Pgs. 24, 50, 84, 89

Eureka Dunes Special Design Area
Environmental Analysis Report

Bakersfield District Office
Bureau of Land Management
Department of the Interior

July 10, 1976

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Appendix B - Eureka Dune Special Design Public Participation Plan

Appendix C - Eureka Sand Dunes Special Design, Vehicle Management Alternatives

Appendix D - Eureka Sand Dunes Public Participation Analysis

Appendix E - BLM's Program to Ensure Compliance with the Endangered Species Act of 1973 (P.L. 93-205) Enclosures to Instruction Memo 75-152

United States Department of the Interior

IN REPLY REFER TO
6292 (C-010.2)

BUREAU OF LAND MANAGEMENT
800 Truxtun Avenue, Room 311
Bakersfield, California 93301
Phone: (805) 861-4191
Office hours: 7:30 a.m. to 4:00 p.m. weekdays

Dear Reader:

Over the past year, many people have expressed their interest in the Bureau of Land Management's plans for the future of the Eureka Dunes of northeastern Inyo County. Public response to the draft management proposal was substantial in both quantity and quality.

In the following Environmental Analysis we have sought to analyze not only the draft management proposal, but also those other alternatives which could reasonably be implemented. These alternatives address a full range of management options, from intensive public use to restricted public use.

Your comments are invited, although the decision process is not one based upon votes. Rather, analysis will be made of the additional information as it affects the existing Environmental Analysis Report. I would like to emphasize that no final decision will be made on implementation of any of these alternatives until all responses have been analyzed. The response period will continue until August 15, 1976, with the final decision to be made by September 1. Comments may be addressed to:

Louis A. Boll
District Manager
Bureau of Land Management
800 Truxtun Avenue, Room 311
Bakersfield, CA 93301

I look forward to hearing from you.

Sincerely,

Louis A. Boll

Louis A. Boll
District Manager

I. INTRODUCTION

In an effort to consolidate the numerous possibilities for management of the Eureka Dunes, suggestions resulting both from initial public input and from BLM personnel familiar with the dunes and surrounding area were consolidated into a list of basic management options. These were then further consolidated and organized so as to eliminate duplicate or unworkable options, or those which would have exceeded bureau authorities. This list of basic management options included the following:

1. Open the dunes to all uses, including off-road vehicles.

2. Partially open the dunes to all uses, including ORV. This suggestion included a number of division patterns for the dune system.

3. Close the dunes to all uses during certain times of the year, i.e., during the spring.

4. Restrict the use of vehicles on the dunes at night.

5. Allow only non-competitive ORV use so as to minimize conflict with other recreational use on the dunes.

6. Require a permit for all uses and establish a maximum carrying capacity.

7. Open the dunes to all recreational uses except ORV.

8. Give the dunes a special designation, such as Natural Area or Primitive Area.

These basic management options were examined and restructured so as to make workable alternatives for a management plan. These alternatives sought to combine as many of the above options as possible, while at the same time providing for a full range of management objectives.

The final range of alternatives are made up of the following:

Proposed Action: Vehicle Use, North Half (Day Only)
Alternative A: Vehicle Use
Alternative B: Vehicle Use, South Half
Alternative C: Recreation, Non-Vehicle (Outstanding Natural Area) (43 CFR 2071.1, 6292.1)
Alternative D: Off Road Vehicle Use by Permit (43 CFR 6225.0-6)
Alternative E: Research by Permit (43 CFR 6225.0-6)

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Non-Living Components

1. Land

a. Geology

Eureka Valley is a down-faulted desert basin surrounded by uplifted mountains. The Last Chance Mountains are to the east, the Saline Mountains are to the south, and the Inyo Mountains are to the west and north. The valley is part of the Basin and Range Province, which stretches from the Sierra Nevadas to the Colorado Plateau (Fig. 0, Regional Map, Fig. 1, Special Design Boundary).

The region has been subjected to intense faulting since an early geologic time, the Larmide Orogeny, continuing into recent geologic time. The ranges were uplifted as tilted fault blocks (Fig. 2, Geologic Map of Eureka Valley). The rugged, sparsely-vegetated, and multi-colored ranges stand out starkly from the sediment-filled valleys. Many of the valleys, including Eureka Valley, are closed basins, which in earlier geologic times were sites of large, deep, fresh water lakes. Now, with a more arid climate, these basins contain shallow ephemeral lakes. The presence of former lakes is marked by playas dry lake beds and wave-cut terraces above the level of the playas (Fig. 3, Generalized Geologic type map). Occasionally, during a wet season, the basin playas collect a thin sheet of water which soon evaporates, leaving saline deposits on the mud flats.

One such playa exists in Eureka Valley. It is two and one-half miles long by a mile wide, and lies northwest of the special design area. The presence of lake sediments (of a swelling type clay, probably bentonitic), extending from the playa to the surrounding higher elevations, is evidence of an extensive lake which once covered the valley floor.

Coalescing alluvial fans originate at the canyon mouths of the surrounding range and extend to the valley floor. Erosion of the surrounding mountains and alluvial fans has gradually filled the south end of the basin with silt, sand, and gravel to a depth of over one thousand feet (Mawby, April 1975).

Several factors are necessary to build a dune formation: the presence of a source of material less than 2 mm in diameter, a recurrent wind strong enough to move the material, and a place where the material can accummulate (Hack 1941). The main sources of dune material are alluvial fans, stream deposits, and weathered outcrops of sandstone. Wind velocities of 23 mph are needed before the wind becomes visibly charged with material (Bagnold 1935). Winds of this velocity occur frequently throughout the desert, particularly in the spring. Places of sand accumulation normally include bushes, mountains, rocks, and other wind obstacles. Dunes may also form where the configuration of the mountains causes the wind to eddy, as in Eureka Valley.

Over thousands of years, the wind has swept across Eureka Valley and transported the finer sand particles to the southern end. This sand has concentrated at its present location as a result of the valley's shape

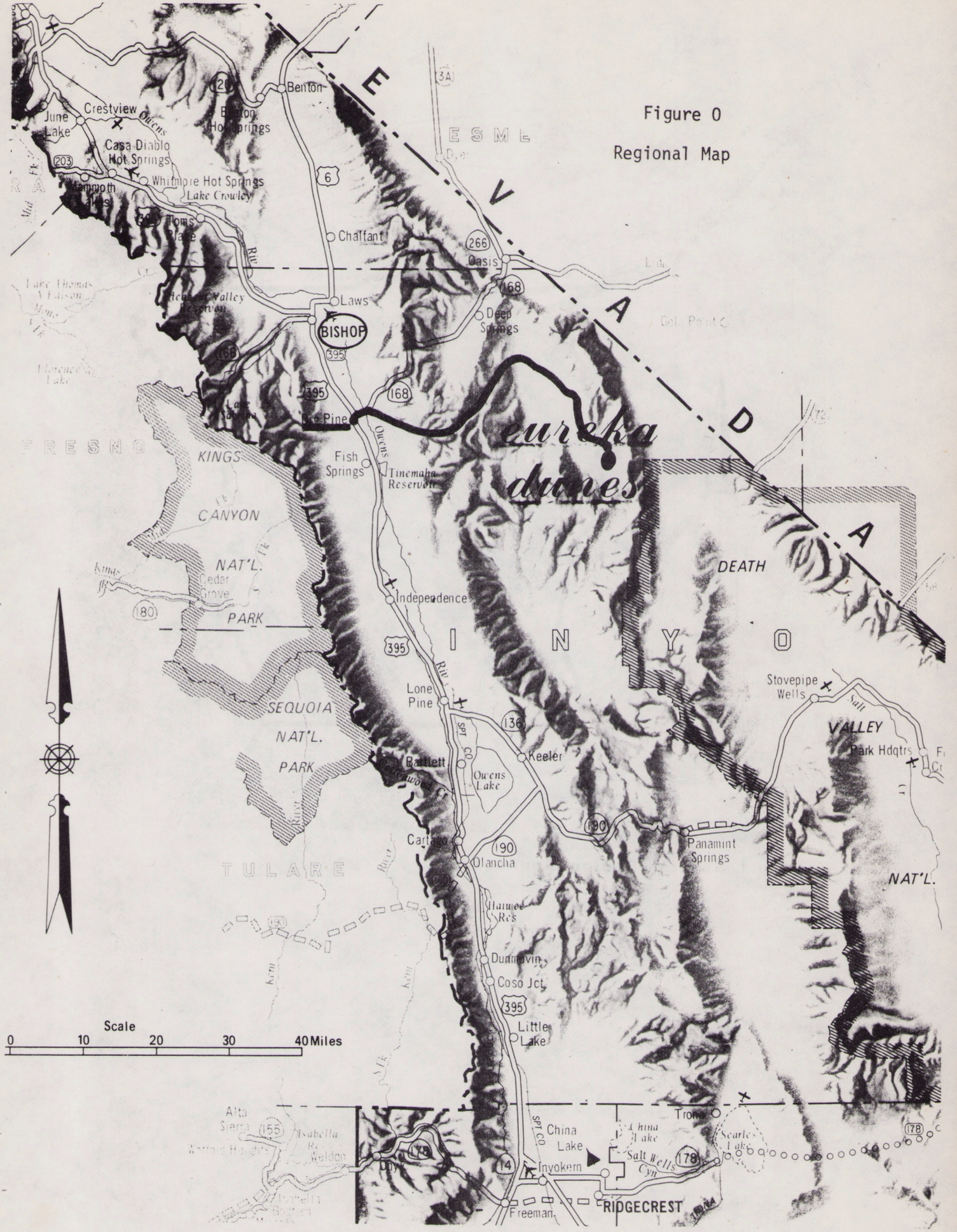
Figure 0
Regional Map
NEVADA
Benton
Crestview
June Lake
Casa Diablo Hot Springs
Whitmore Hot Springs
Lake Crowley
Mammoth Lakes
Chalfant
Oasis
Laws
BISHOP
Deep Springs
Big Pine
Fish Springs
Tinemaha Reservoir
eureka dunes
FRESNO
KINGS
CANYON
NAT'L.
Cedar Grove
PARK
SEQUOIA
NAT'L.
PARK
TULARE
Independence
INYO
DEATH
VALLEY
Park Hdqtrs
Stovepipe Wells
Lone Pine
Bartlett
Keeler
Owens Lake
Olancha
Panamint Springs
NAT'L.
Haiwee Res
Dunmovin
Coso Jct
Little Lake
Alta Sierra
Isabella
Weldon
China Lake
Trona
Searles Lake
Salt Wells Cyn
Inyokern
Freeman
RIDGECREST
Scale
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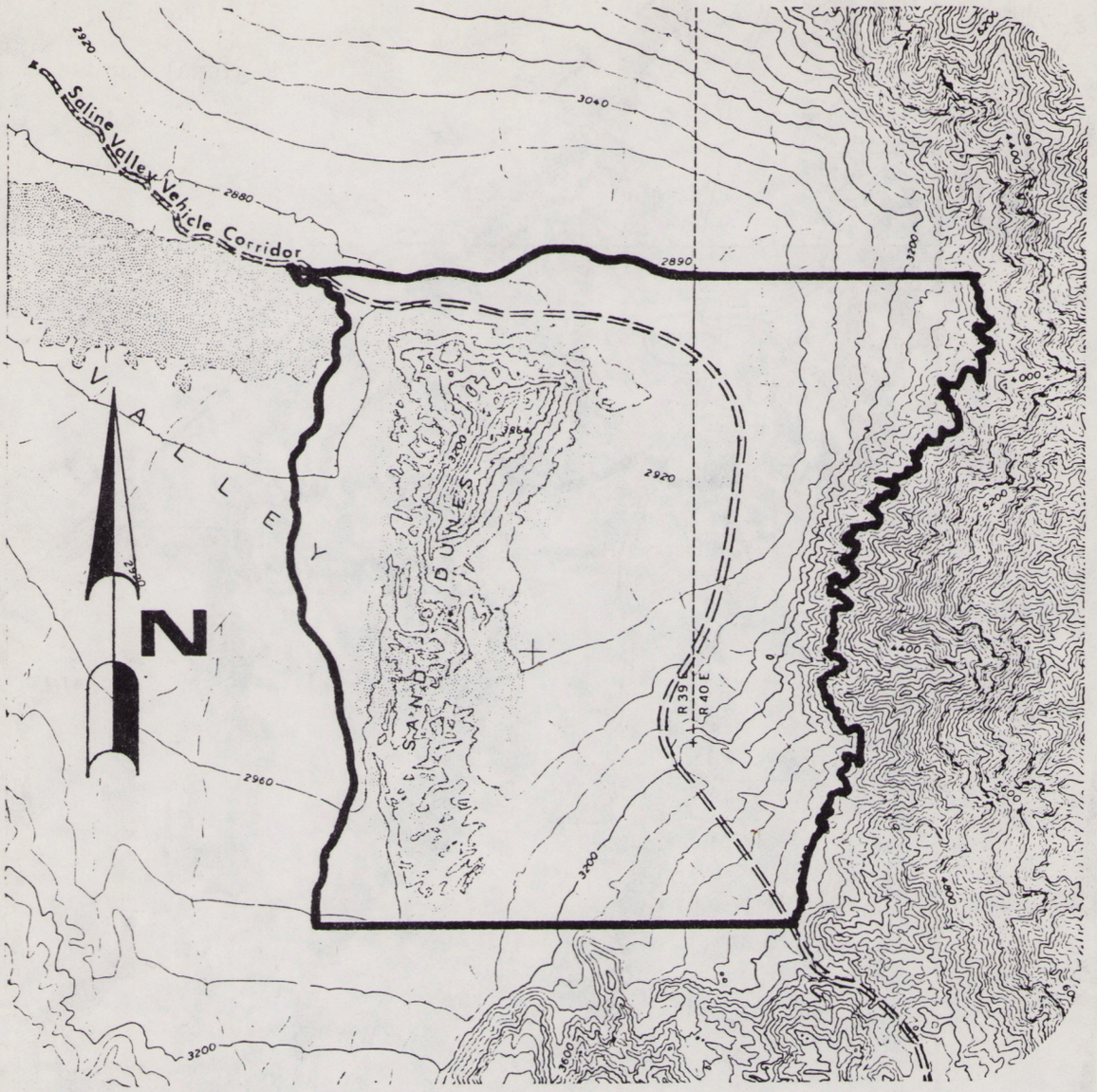


Fig. 1. Special Design Boundary

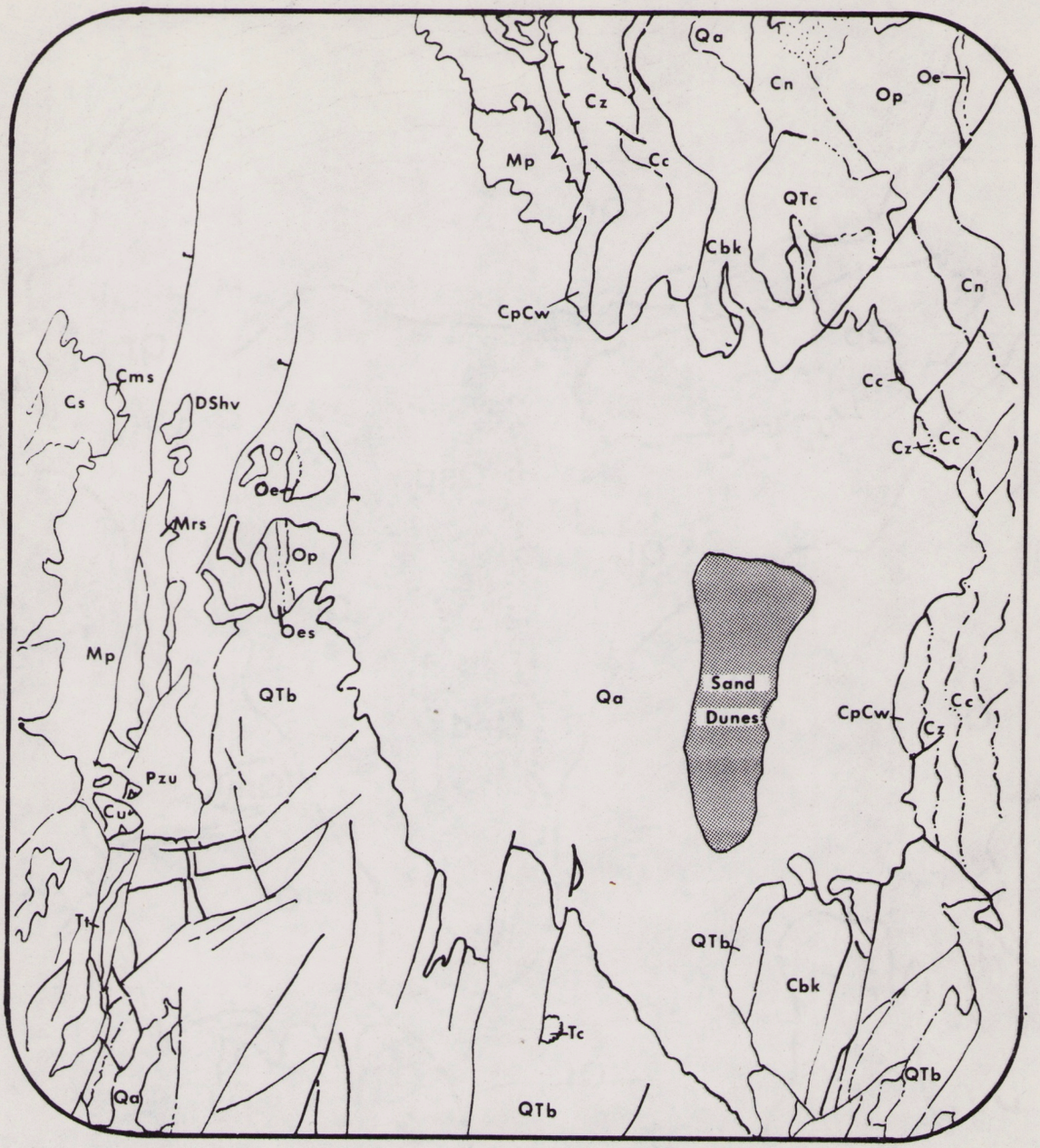


Fig. 2. Geologic Map of Eureka Valley

Sedimentary

Quaternary	Qa	Alluvial Deposits
Cambrian	Ebc	Bonanza King
Cambrian	Ec	Carrara Formation
Cambrian	Ez	Zabriskie
Precambrian	EpEw	Wood Canyon Formation

Igneous

Tertiary Qtb Volcanic (basalt)

Source: USDI U.S. Geological Survey Generalized Geologic Map of the Inyo Mountains Regions, California 1967.

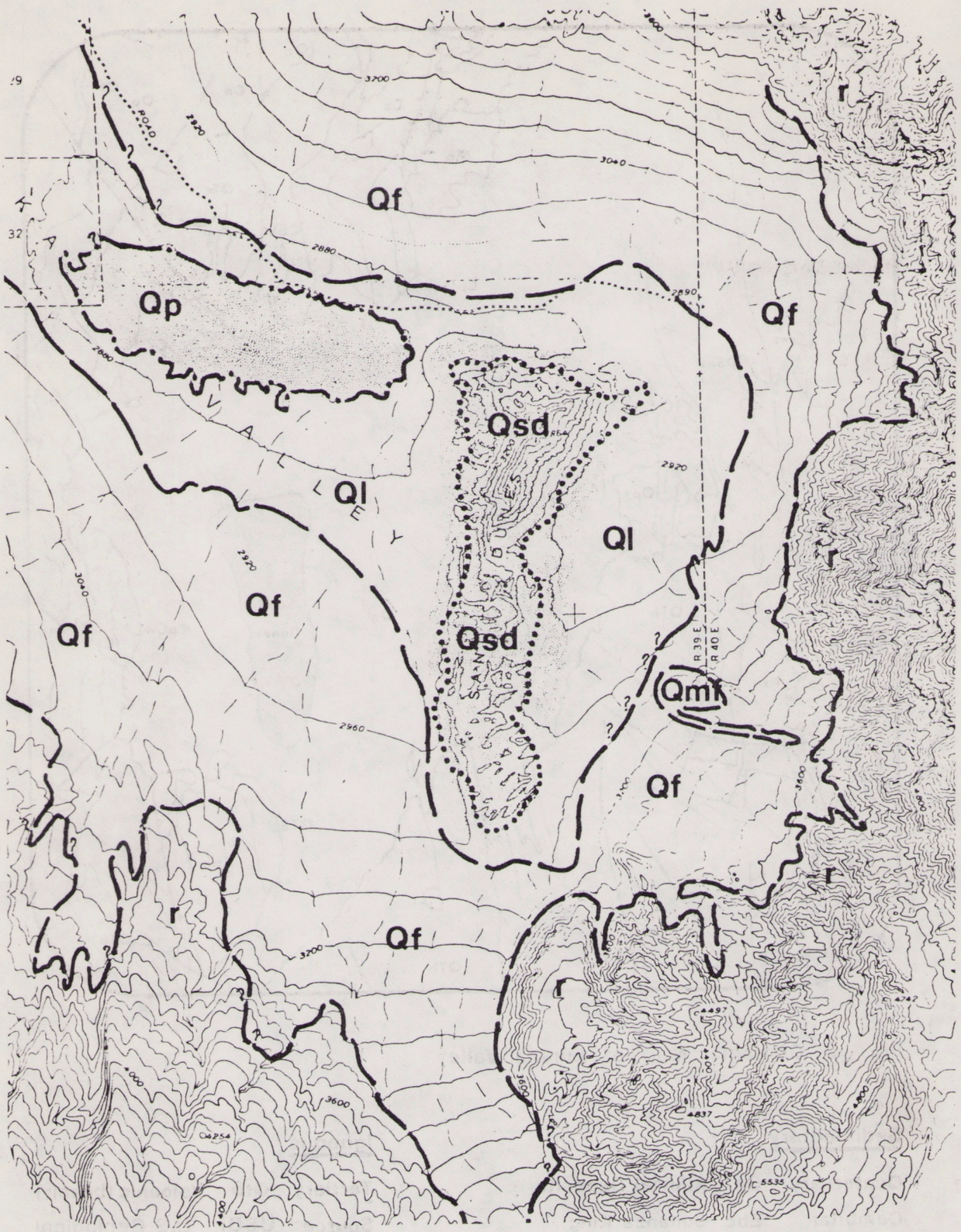


Fig. 3. Generalized Geologic Type Map, Eureka Dunes Area

Quaternary

Qsd _____ Sand Dune
Qp _____ Playa
Ql _____ Lake Bed
Qmf _____ Mudflow
Qf _____ Alluvial Deposits and Alluvial Fans

Tertiary, pre-Tertiary

r _____ Bedrock
— — — ....? Contact (questioned where uncertain)

and the prevailing winds. North of the dunes the valley narrows to a width of about three miles, then opens into a large, circular shaped basin at the southern end of the valley. North or northwest winds, funneled through the constricted part of the valley, swirl around the southern basin and, slowed down, lose their ability to transport the sand, which then settles to form the dune accumulation.

The sand is partially stabilized, once it reaches the dunes, by moisture, vegetation and wind patterns. The overall shape of the dunes is remarkedly constant. However, the details of the dune configuration are constantly changing. The sharpness of the dune crest indicates that the dunes are active.

The dune formation is approximately a mile (2.4 km) wide by three miles (5.3 km) long by 680 feet (208 m) high. The system is a complex/longitudinal dune with long, parallel, sinuous ridges. The convex windward side has slopes of approximately 20^{o}, and the steep leeward side (or slip face) has an average slope of 33^{o}. The formation of a longitudinal dune requires a large supply of sand, strong wind velocities, and variable wind directions. The sand grains of this dune are primarily quartz with minor elements of other minerals such as magnetite, feldspar, and mica.

The age of the dunes is unknown. The sand dunes in Death Valley are thought to have formed in the last several thousand years. Because of the presence of unique species of plants and animals which have been evolving in their special habitat for at least several thousand years, it seems likely that the Eureka Dunes are much older than this. The dunes might have begun to accummulate as the climate became more arid, with the waning of the last ice age approximately 10,000 years ago. More study is needed to answer this question.

b. Soils

The processes which are important in weathering the bedrock, and in the development of soils, are somewhat similar in both humid and desert regions. Bedrock weathering and soil formation are governed by climate, types and amounts of vegetation and other living organisms present, topography, type of bedrock or parent material, and time. However, because of limited rainfall, weathering processes in deserts are mostly physical as opposed to predominantly chemical weathering in less arid climates. For this reason, the soil of the desert reflects many of the characteristics of its parent material. Desert soils usually contain low amounts of organic matter and have a low population of soil bacteria and microorganisms. Low precipitation limits leaching. Soluable salts are usually leached only to depths of one to two feet into the soil. Weak to moderate carbonate horizons form below the leached area. Carbonate accumulation or a "caliche" layer is usually formed close to the surface because limited moisure is available to move the carbonates down through the soil profile. For these reasons, desert soils are generally light-colored and sandy in texture. The low vegetative density and lack of soil moisture in the area surrounding the dunes causes the soil to be very susceptible to disturbance and erosion.

The valley fills, several hundred to a thousand or more feet deep, are of alluvial origin. There is little soil profile development. Most of the surface material was sorted and moved by water and wind before it became stabilized.

Wind erosion in the desert surrounding the dunes is of two types, deflation and abrasion. Deflation has scoured out portions of the valley and surrounding slopes. "Desert pavement" remains in the areas of deflated alluvium. Desert pavement is a layer of closely spaced rocks and gravel less than six inches wide but too large to be picked up by the wind. Desert pavement acts as a protection from further wind action. Beneath this armored surface is much finer material. If the pavement is disturbed, the wind will remove newly exposed soil down to a new layer of rock. The individual pebbles in the pavement often show abrasive wear from blowing soil. The surfaces of rocks exposed for a long time are stained black with manganese and iron oxides, called desert varnish. These oxides are thought to originate partially from dust settling on the rocks and chemically coating the rock surfaces.

In areas where desert pavement does not exist, a thin crust may form on the soil surface, through physical, chemical, and biological activity. Grains of soil may become cemented by crystallization of solutes following rains, and bound by algae, lichenuos, and fungal growth where organic matter is present (Cameron and Blank 1966; Went and Stark 1968). Algae and fungal filaments have often bound the alluvial soils into a crust in the top two to five inches of the soil profile, increasing the nitrogen content by as much as 300% and 400% (Fletcher and Martin 1948). These delicate crusts act as a lid, minimizing the erosion of the fine material beneath the surface. Considerable rain is necessary to enable algae growth to reaccummulate after it has been disturbed.

The surface of the dunes tends to stabilize as sand grains are sorted and the surface is streamlined by wind action. Fine material is blown off as dust, and the coarser grains tend to form a seal (Pond 1962). Where there are plants, fungal mycelia associated with the roots further helps to bind the sand.

A special study of California Desert soils subjected to recreational vehicle use was performed in May, 1973 by Babcock and Sons, on ten sites throughout the desert. The criteria used for evaluation were changes in soil density, void ratio, and percolation rates of the surface horizon. From a soils-engineering standpoint, poorly sorted sands (high percentage of similar size and particles) of the dune areas showed the greatest resistance to vehicular use. Well graded soils, with a wide range of particle sizes, were the least resistant to vehicular use. A significant increase in density, and decrease in porosity and percolation capacities, caused by vehicular use were noted in the areas tested.

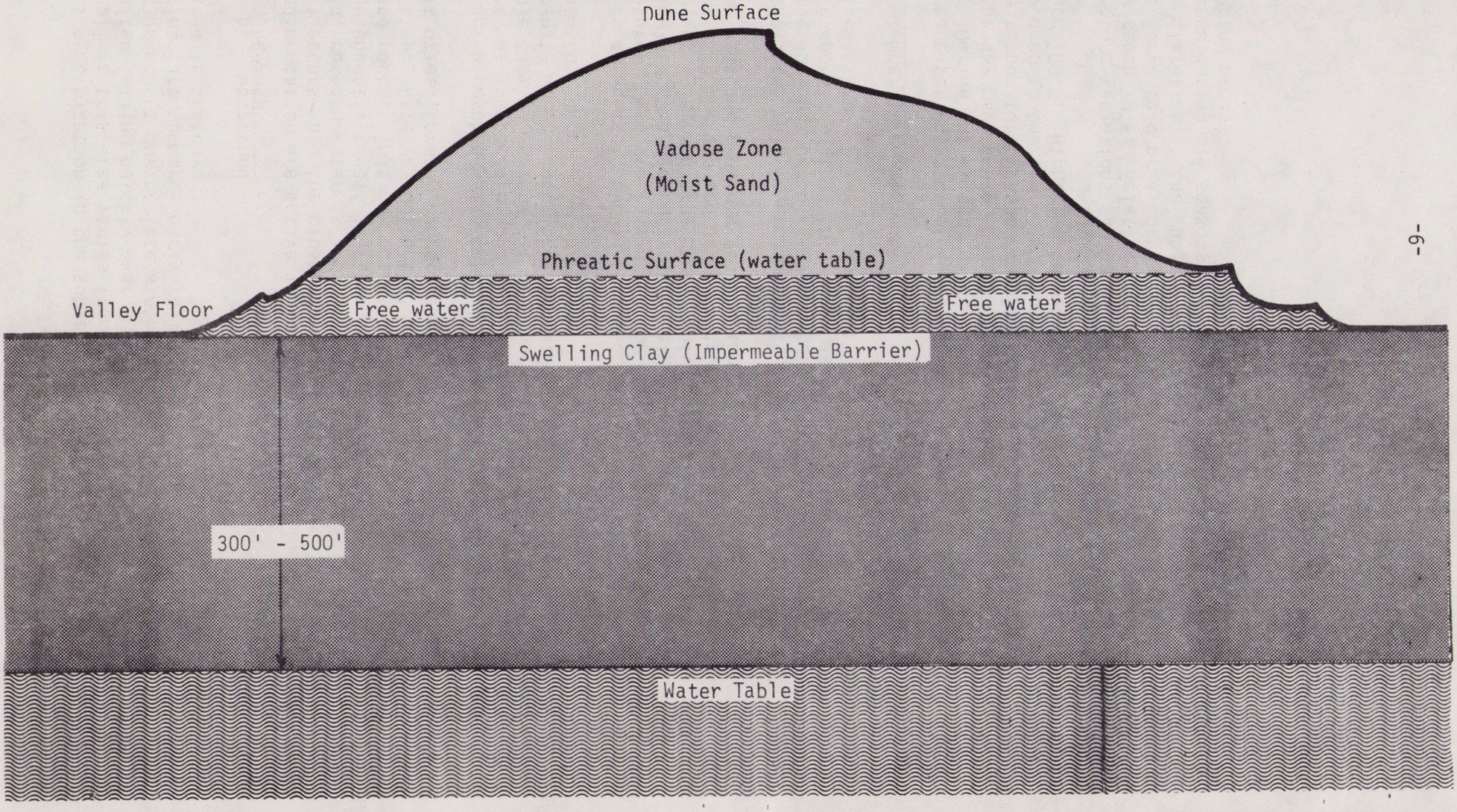
2. Water

a. Precipitation

Fig. 4.

SAND DUNE WATER TABLE

(Diagrammatic Cross Section)



The mean annual precipitation in the subject area is approximately six inches. Rainfall in this area varies from one extreme to the other. It is sporadic, often falling quickly over a short period of time. Most of the precipitation occurs during late winter storms, from December to March, and during late summer - early fall thunderstorms. Precipitation data for the area is sketchy.

b. Watershed

Erosion and sedimentation are active in the desert despite low precipitation. Runoff occurs into the closed Eureka Valley basin. Although the climate is arid, running water is a major erosional agent. Infiltration is minimal, consequently runoff is rapid, transporting large amounts of soil, gravel and rocks. This has resulted in large alluvial fans being built up over time. After a substantial rain, runoff collects on the playa, where it dries, forming evaporite deposits.

Eureka Valley has a perched water table located at a depth of approximately 300 to 500 feet, as indicated by old well-drilling records. The valley has a noticeable lack of springs; it is a horst (upthrust) block of impermeable granite which blocks the flow of underground water from other areas into the valley.

The dunes act as an aquifer, providing the dune ecosystem with a perpetual supply of moisture. Moisture falling on the dunes infiltrates rapidly, percolating slowly downward as gravitational water. Capillary water remains in the upper layer of the dune. Only the top few inches to a foot of sand warm in the sun and dry by evaporation. Beneath this the sand blocks the heat and prevents evaporation (Fig. 4).

East of the dunes, the thin layer of sand is underlain by the old clay lake bed. Water does not percolate far into clay. The sand over the clay prevents evaporation; thus this area has an above average supply of available soil moisture.

3. Temperature

The subject area experiences great extremes in temperature, both seasonally and diurnally. During the winter, night temperatures may drop to below freezing and the day may remain cold, or become unseasonably warm. Average winter daytime temperatures range from 55°F to 60°F. Nighttime temperatures commonly drop to the low 30's. Summer daytime temperatures frequently reach 100°F. Nighttime temperatures vary from 60°F to 70°F.

Diurnal temperature varjations may be as large as 50°F, and seasonal variations may reach 90°F. Relative humidity is low throughout the year resulting in a "dry" cold or a "dry" heat. Temperatures vary with exposure. The elevation of the subject area (3000 feet) exerts a cooling influence during all seasons (See Table 1 for temperature data on the surrounding areas).

Table 1 TEMPERATURE DATA

Station	Elevation	Time Data Recorded	Average Temp. High Month Ave.	Average Temp. Low Month Ave.	Average Temp. Annual Average	1973 Temp. Extremes High-date	1973 Temp. Extremes Low-date
Death Valley	-194 ft.	60 yrs.	101° July	52° Jan.	76°	124° 7/6	24° 1/7
Deep Springs College	5225 ft.	21 yrs.	75° July	33° Feb.	--	100° 6/8	-10° 1/23
Haiwee	3440 ft.	--	81° July	40° Jan.	60°	104° 7/5	12° 1/7
Independence	3950 ft.	66 yrs.	81° July	35° Jan.	58°	105° 7/6	9° 1/6
Trona	1716 ft.	--	89° July	45° Jan.	67°	114° 7/5	13° 1/7
Wildrose Ranger Station	4100 ft.	8 yrs.	80° July	34° Jan.	58°	102° 7/6	11° 1/10

Source: Climatological Data
U. S. Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Data Service
California Annual Summary 1973 Vol. 77 #13

4. Air

The subject area is located within the Great Basin Air Basin, which includes the desert area north of the San Bernardino County line. This area is relatively pollution free, because the basin is located far from major population centers and is not subject to an influx of contaminated air from other basins. However, there is virtually no data on air pollution sources or ambient air quality in this basin.

There are no significant stationary pollution sources in the subject area. Some small mines contribute negligible amounts of dust pollution. One major county road traverses the area. An unimproved dirt road extends to the dunes, becoming a jeep trail beyond. There is little evidence of an air pollution problem from this source. Recreational vehicle use currently has only minor, intermittent, direct detrimental effect on the air quality. The main air pollution which occurs is from particulates which rise during strong winds. Temperature inversions during the fall-winter period affect air quality. An inversion layer prevents air from rising and holds any pollutants close to the surface.

B. Living Components

1. Flora

Desert plants can be classified on the basis of their adaptation to the aridity of the desert environment. Some plant species can survive long rainless periods. These are the true drought survivors, or xerophytes. Other species which require intermittent moisture and are not drought-resistant, are called mesophytes. Hydrophytes grow in water and phreatophytes have roots which extend down to the level of ground water.

There are three types of xerophytes. Annuals live only during times of available soil moisture, completing their life cycle within a few weeks or months. Succulents are water-storing species which use their stored water sparingly in times of drought. Non-succulents have adaptations for more efficient water utilization and conservation. Adaptations include stomatal modifications, reduced total leaf surface, waxy or hairy leaves and extensive horizonal and vertical root systems.

Seeds in the desert resist drought for many years, and remain dormant in the soil until moisture and temperature conditions are favorable for germination. Many desert plants are armed with spines or thorns which provide added protection from both drought and depredation from fauna (Chew, R.M. and A.E., 1973; Ashby 1932; and Ryon, 1974).

Most desert annuals start growth in late autumn, slow or stop growth in the winter, and produce flowers the following spring. They require daytime temperatures of 60 to 65 degrees F., and night temperatures generally above freezing, combined with winter rainfall of at least one inch. Flower production requires a long photoperiod, so the actual blooming period avoids cool, wet winter conditions. (Luckenbach, 1975). Summer annuals have extremely contracted growth periods and are often much reduced in size. They germinate in the spring and require one-half inch or more of rainfall and optimum temperatures of 80^{o} to 90^{o}F (Luckenbach, 1975).

The vegetation in Eureka Valley is composed of a creosote bush scrub community. A special dune association, of plants adapted to sandy substrates is located on and around the Eureka sand dunes. Many of the species in the dune association are found throughout parts of the Mojave Desert in varying relative abundancies and densities. In various locations, the exact nighes in which these plants are found vary, as does the importance of the role the plants play in the particular community. Three endemic plants that grow on the dune or near the base of the dune have been identified. They also are found at the southwest end of Eureka Valley on the shallow sand buildup near the mouth of Marble Canyon. These are as follows:

Family	Genus/Species	Common Name
Gramineae	Swallenia alexandrae	Eureka dunegrass
Onagraceae	Oenothera avita ssp. Eurekensis	Eureka Valley evening primrose
Fagaceae	Astragalus lentigonosus var. micans	Shiny locoweed

The first two of these three plants are included in the proposed Department of the Interior's "Threatened or Endangered Fauna or Flora" listing (Review of Status of Vascular Plants and Determination of "Critical Habitat"). The listing was based on a report from the Smithsonian Institution, and was published in the Federal Register, Vol. 40, No. 127, July 1, 1975, in accordance with section 12 of the Endangered Species Act of 1973. This publication was intended to alert concerned persons to seek data, advice, and relevant information, and to inform them that these plants are being considered for addition to the federal lists of the threatened or endangered species. The June 16, 1976 Federal Register Vol. 41, No. 117 contains the Proposed Endangered Status for some 1700 U. S. Vascular Plant Taxa. There will be a 90-day comment period ending August 16, 1976 after which the list will officially become part of Part 17, Subchapter B of Chapter 1, Title 50 of the Code of Federal Regulations.

Section 12 of the endangered Species Act of 1973 follows:

Public Law 93-205
93rd Congress, S. 1983
December 28, 1973

ENDANGERED PLANTS

"Section 12. The Secretary of the Smithsonian Institution, in conjunction with other affected agencies, is authorized and directed to review (1) species of plants which are now or may become endangered or threatened and (2) methods of adequately conserving such species, and to report to Congress, within one

year after the date of the enactment of this Act, the results of such review including recommendations for new legislation or the amendment of existing legislation."

The term "endangered species" indicates any species which is in danger of extinction throughout all or a significant portion of its range. The term "threatened species" indicates any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Eureka dunegrass and Eureka Valley evening primrose are both listed as Endangered on the Federal list. Shiny locoweed is not on the new Endangered Federal list, although it had been on the preliminary list proposed by the Smithsonian. It may appear on the Threatened list when that appears. The three endemics to the Eureka dunes are also listed and rated on the California Native Plant Society's "Inventory of Rare and Endangered Vascular Plants of California" (Fig. 5).

Eureka dunegrass, a member of the Gramineae family, is the only member in its genus. It is a coarse, stiff perennial, with running rootstocks which act tp sp,e degree, as a stabilizer for the drifting sands. The dunegrass is found throughout the dunes and extends well up the slopes. (Fig. 6).

Shiny locoweed is a member of the pea family. This gray perennial may grow as high as two or three feet and is found in medium concentrations in hollows near the base of the dunes. The major concentration is found in the area east of the dunes, at the north end, and a light concentration grows at the southeast end of the dunes. (Fig. 7).

The Eureka Valley evening primrose is the most fragile of the endemics. It grows on the lower slopes and sandy flats at the base of the dunes. The main population grows in heavy concentrations east of the north half of the dune formation. Medium and light concentrations of the plant are found east of the southern half of the dunes, around the north and south end, and along the west side (Fig. 8). This perennial has the unusual ability to grow from the tips of its old stems, a unique adaptive quality, as the old plant is often covered by drifting sand.

Other common desert plants found in or near the Special Design Area include:

1. Abronia turbinata - sand-verbena.

2. Allionia incarnata - windmills.

3. Antirrhinum kingii- least snapdragon. A delicate annual found among the mallow around the northeast corner of the dunes.

4. Astragalus sabulonum sand rattleweed.

Figure 5. California Native Plant Society Ratings

Rating	R-E-V-D
Eureka dunegrass	3-2-1-3
Eureka Valley evening primrose	3-2-2-3
Shiny locoweed	3-2-1-3

Rarity (R)

1. Rare, or limited distribution, but distributed widely enough that potential for extinction or extirpation is apparently low at present.
2. Occurrence confined to several populations or one extended population.
3. Occurs in such small numbers that it is seldom reported; or occurs in one or very few highly restricted populations.

P. E. Possibly extinct or extirpated.

Endangerment (E)

1. Not endangered.
2. Endangered in part.
3. Totally endangered.

Vigor (V)

1. Stable or increasing.
2. Declining.
3. Approaching extinctin or extirpation.

General Distribution (D)

1. Not rare outside California.
2. Rare outside California.
3. Endemic to California.

Fig. 6. Distribution of Eureka dunegrass (Swallenia alexandrae)

CONCENTRATIONS
light .....
medium — — — — —
heavy ————————

Fig. 7. Distribution of shiny locoweed (Astragalus lentiginosus var micans)

CONCENTRATIONS
light .....
medium — — — — —
heavy ———————

Fig. 8. Distribution of Eureka Valley evening primrose (Oenothera avita ssp eurekensis)

CONCENTRATIONS
light .....
medium — — — — —
heavy ————————

5. Atrichoseris platyphylla - gravel ghost. One of the Death Valley species which occurs near but not on the dunes.

6. Atriplex canescens - four-wing saltbush.

7. Atriplex confertifolia - shadscale.

8. Atriplex polycarpa - allscale. The dominant shrub over much of the area bordering the dunes ascending to the fans where it meets creosote bush.

9. Atriplex truncata - wedgescale.

10. Baileya pleniradiata - woolly marigold.

11. Blepharidachne kingii - king's eyelash grass.

12. Bouteloua barbata - six-week grama.

13. Camissonia claviformis ssp. funerea - brown-eyed primrose, common.

14. Chaenactis carphoclinia - pebble pincushion. A common species in creosote bush scrub community.

15. Chaetadelphia wheeleri - May reach its southern limit in Eureka Valley.

16. Chorizanthe rigida - rosy thorn, common.

17. Cleome sparsifolia - spiderwort.

18. Coldenia plicata - small perennial common on lower slopes and sandy flats. Long thread-like root, anchored by deeply buried capsule allows movement with wind blown sand.

19. Dalea polyadenia - dotted dalea, common.

20. Dicoria canescens ssp. clarkae - clark's dicoria. A composite late autumn maturing annual.

21. Eriogonum insigne - buckwheat.

22. Eriogonum reniforme - kidney-leaved buckwheat.

23. Euphorbia micromera - desert sand mat.

24. Euphorbia ocellata var. arenicola - yellow-flowered spurge.

25. Hymenoclea salsola - cheese bush.

26. Larrea tridentata - creosote bush. Dominant shrub descending the fans on the east side of the special design area.

27. Lupinus shockleyi - shockley lupine. A small rather uncommon annual of sandy areas.

28. Nama demissum - purple mat.

29. Oryzopsis hymenoides - Indian rice grass. Found throughout the area. An almost pure stand, forty acres of more is located on the east side of the dunes.

30. Palafoxia arida - Spanish needle.

31. Pectis papposa - chinch-weed.

32. Salsola paulsenii - barbwire russian thistle.

33. Sphaeralcea ambigua - Apricot mallow. Best developed along the east side of dunes.

34. Stanleya pinnata ssp. inyoensis - Inyo desert plume. Type locality is the northeast end of the dunes. (First recorded discovery of this subspecies).

35. Stephanomeria pauciflora - Desert straw.

Within any community there are instances or factors which cause vulnerability in generally damage-resistant communities, or factors which lend resistance to normally vulnerable communties. These factors have been considered in the following site evaluation. Criteria used for evaluating potential damage to the vegetation resource by recreation vehicle use includes the following:

1. Vulnerability of plant species according to growth form, distribution, density and/or armament, and probability for revegetation.

2. Vulnerability of individual sites according to terrain, location, accessibility and/or attractiveness to people.

3. Presence of rare, endangered or unique plant species.

4. Importance of plant species or plant communities to the rest of the local ecosystem.

5. Tendency of vehicle operators to avoid natural obstacles which might damage person or vehicle.

Using these criteria, we evaluate the plant communities of the areas as follows:

Plant Community	Percent of Desert Represented	Vulnerability to Vehicle Use
Creosote Bush Scrub	60	Low generally
Shadscale Scrub	1±	Low generally
Desert Grassland	less than 1	High
Desert Wash	1±	Low

2. Fauna

The desert area supports a wide variety of wildlife species. Generally speaking, animal population dynamics are the same, in principle, in desert populations as in any animal population. There are, however, centain unique adaptative qualities that are present in desert populations.

The harsh climate imposes limitations on the types of fauna able to inhabit the area. Certain species are more suited than others to coping with limited water, often limited food, and high summer and low winter temperatures. There are few large herbivores or carnivores as large mammals need great amounts of water for evaporative cooling during summer heat. Vegetation is often sparse, limiting browsers to those which are general in dietary needs. Rodent, reptile and bird populations make up the bulk of the vertebrate biomass. These small species escape the heat by burrowing or seeking shade in low shrubs. This reduces the need for evaporative water. Some species can obtain most of their water needs from food. Birds often migrate to escape the extreme summer heat. Reptilian species are dependent on high ambient temperatures to remain active. During the summer they generally avoid midday sun; many are nocturnal. Snakes and lizards generally hibernate during the colder periods of winter.

Desert populations are mainly cyclic, remaining at a low subsistence level during periods of stress, then responding to optimum environmental conditions. The amount of biomass of animals per acre in the desert is low compared with other areas, because of environmental conditions such as limited amounts of food, water, and cover.

Many species of birds inhabit the desert as migrants and as residents. But, bird populations are limited by the lack of abundant food and free water.

Adaptation, both physical and behavioral, is the key to desert survival. The environment requires species to utilize adaptative qualities that enable them to cope with the harsh climate and adverse habitat conditions. Some adaptations include nocturnality summer or diurnal periods of estivation, burrowing, physiological adaptations, and restriction to micro-habitats (ICMP Environmental Analysis, 1973).

Most animal activity is nocturnal, and thus goes unnoticed by casual observers. There are, however, numerous animal species which inhabit the Special Design Area. These includes:

Birds

Turkey vulture (Cathartes aura) migrant.

Swainsons hawk (Buteo swainsoni) migrant.

Red-tailed hawk (Buteo jamaicensis) permanent resident, nests in Last Chance Mountains.

Prairie falcon (Falco mexicanus) permanent resident, nests in Last Chance Mountains.

Golden eagle (Aquila chrysaetos) permanent resident, may nest in Last Chance Mountains.

American kestrel (Falco sparverius) permanent resident

Burrowing owl (Speotyto cunicularia) hypothetical occurrence.

Great horned owl (Bubo virginianus) permanent resident, nests in Last Chance Mountains.

Mourning dove (Zenaida macroura) migrant.

White-throated swift (Aeronautes saxatalis) nests in Last Change Mountains.

Say's phoebe (Sayornis saya) permanent resident, breeds in area.

Ash-throated flycatcher (Myiarchus cinerascens) breeds.

Horned lark (Eremophila alpestris) permanent resident, nests near dunes.

Violet-green swallow (Tachycineta thalassina) may nest in Last Chance Range

Common raven (Corvus corax) permanent resident, nests in Last Chance Mountains.

Rock wren (Salpinctes obsoletus) permanent resident, breeds.

Mockingbird (Mimus polyglottas) breeds near dunes.

Le Conte's thrasher (Toxostoma lecontei) may breed near dunes.

Phainopepla (Phainopepla nitens) may breed near dunes.

Loggerhead shrike (Lanius ludovicianus) permanent resident, probably breeds near dunes.
Starling (Sturnus vulgaris) migrant.

Black-throated gray warbler (Dendroica nigrescens) migrant.

Wilsons warbler (Wilsonia pusilla) migrant.

Yellow warbler (Dendroica petechia)

House finch (Carpodacus mexicanus) permanent resident, probably breeds near dunes.

Brewer's sparrow (Spizella breweri) migrant.

Savannah sparrow (Passercules sandwichensis) migrant.

Black-throated sparrow (Amphispiza bilineata) summer resident, breeds near dunes.

Sage sparrow (Amphispiza belli) winter - migrant.

White-crowned sparrow (Zonotrichia leucophrys) winter resident.

The preceeding list of birds use the dune area to some extent during their life cycles.

On occasions (e.g., the fall of 1975) an especially heavy rainstorm partially fills the dry lake area west of the dunes. During these periods, various water birds have been observed in or would be expected to utilize, this area, especially in the spring and fall months. These are:

Pintail (Anas acuta) and other water fowl

Killdeer (Charadrius vociferus)

American avocet (Recurvirostra americana)

Wilson's phalarope (Steganopus tricolor)

Spotted sandpiper (Actitis macularia)

Least sandpiper (Erolia minutilla) and possibly several other species of shorebirds.

Reptiles

Desert iguana (Dipsosaurus dorsalis dorsalis) sandy plains, creosote flats sand hummocks, lays eggs underground June - August hatch August, September burrows 2 inches to 2 feet in sand.

Collared lizard (Crotophytus collaris baileyi) rocky habitat - east side of special design area.

Long-nosed leopard lizard (Crotophytus wislizenii wislizenii) playa edges, dune edges, scattered shrubs - eat lizards, insects, lay eggs July-August, hatch August, September diurnal.

Zebra-tailed lizard (Callisaurus draconoides rhodosticus) loose sand - diurnal, sometimes nocturnal, morning and evenings.

Side-blotched lizard (Uta stansburiana) all soil types, diurnal lay eggs July, hatch August.

Northern Desert-horned lizard (Phrynosoma platyrhinos calidiarum) sandy soil ow shallowly, diurnal, lay eggs July - hatch August.

Desert Banded gecko (Coleonyx variegates variegatus) hypothetical occurrence rocky habitat, frequents sandy flats, lays eggs - hatch fall

Western whiptail (Cnemidophorus tigris) vegetated fine soils - diurnal eggs hatch July, August.

Nevada shovel-nosed snake (Chionactis occipitalis talpina) hypothetical occurrence playa, sand - predommantely nocturnal, peak activity May-June rapid burrower, nasal valves, countersunk jaws, burrows 2 inches to 2 feet, eats insects.

Common Whipsnake (Masticophis flagillum piceus) hypothetical

Spotted nigret snake (Nypsiglena torquata deserticola) hypothetical.

Great Basin gopher snake (Pituophis melanoleucus deserticola) Not on dune - active 24 hours. Eggs hatch September, October.

Panamint rattlesnake (Crotalus mitchelli stephensi) hypothetical occurence rock dweller - occasional in sand-commonly nocturnal, diurnal spring, fall

Sidewinder (Crotalus cerastes) playa, dunes, nocturnal plus dusk and cool days bury coiled just under surface birth of young September, October.

Mammals

Desert kit fox (Vulpes macrotis arsipus)

Desert coyote (Canis latrans estor)

Desert bobcat (Lynx rufus baileyi)

Desert antelope ground squirrel (Ammospermophilus leucurus leucurus) (does not estivate).

Pocket gopher (Thomomys bottae melanotus)

Utah long-tailed pocket mouse (Perognathus formosus formosus)

Silky Pocket mouse (Perognathus longimembris)

Merriam's kangaroo rat (Dipodomys merriami merriami)

Desert kangaroo rat (Dipodomys deserti deserti) restricted to wind blown sand habitat.

Pallid kangaroo mouse (Microdipodops pallidus) southern limit of known range

Southern grasshopper mouse (Onychomys torridus longicaudus)

Cactus mouse (Peromyscus eremicus)

Desert woodrat (Neotoma lepida lepida)

Desert jack rabbit (Lepus californicus deserticola)

Desert bighorn (Ovis canadensis nelsoni) ordinarily confined to the Last Chance Mountains, however individuals may rarely wander near the dunes.

1. Hypothetical (Ingles 1970)
2. Hypothetical (Hall and Kelson 1959)
3. Confirmed from Death Valley, Saline Valley, Deep Springs or Owens Valley and possibly occuring in Eureka Valley.

1,2 Little brown bat (Myotis lucifugus)

1,2,3 Yuma Myotis (Myotis yumanensis)

1,2,3 Long-eared Myotis (Myotis evotis)

1,2 Fringed Myotis (Myotis thysanodes)

1,2,3 Long-legged Myotis (Myotis volans)

1,2,3 California Myotis (Myotis californicus)

1,2,3 Small footed Myotis (Myotis subulatus)

1,2,3 Silver-haired bat (Lasionycteris noctivagans)

1,2,3 Western Pipestrelle (Pipistrellus hesperus)

1,2,3 Big brown bat (Eptesicus fuscus)

2 Red bat (Lasiurus borealis)

2,3 Hoary bat (Lasiurus cinereus)

2 Spotted bat (Euderma maculata)

2 Lump-nosed bat (Plecotus townsendi)

1,2,3 Pallid bat (Antrozous pallidus)

1,2,3 Brazilian free-tailed bat (Tadarida brasiliensis)

A species of fairy shrimp, Branchinecta sp., is found in the playa west of the dunes when water is present after summer rainstorms. The shrimp are about one inch in length. Eggs are laid in a pool of water and when it evaporates, the eggs dry up and become encysted. When environmental factors are right, e.g. salinity of water, amount of available oxygen, and temperature, the eggs hatch, and quickly mature into adult shrimp. Several species of birds probably feed on these shrimp.

There are several species of insects on these dunes which have adopted highly specialized characteristics, over countless years of isolation from other sand insects. They have lost their ability to fly, and are larger than their nearest relatives living under more moderate conditions. Four species are endemic to the dunes. Their life histories, presently unknown, are being studied by insect specialists.

The following Coleoptera occur at the dunes: (The first four are endemics)

1. Cardiophorus n. sp. all species of this large genus are restricted to sand dunes or sandy soil: Predatory larvae.

2. Horistonotus n. sp. - similar to Cardiophorus. Only a single species previously known from California.

3. Aegialia n. sp. - nearly all restricted to sand substrates; many species.

4. Miloderes nelsoni - fairly widespread on dunes within Great Basin, possibly occurring as far south as Kelso Dunes.

5. Lariversius tibialis - similar distribution to above.

6. Trogloderus costatus - widespread, but greatly differentiated locally. Taxonomy needs to be reevaluated.

7. Eusattus muricatus - widespread on interior dunes. Many locally differentiated populations.

8. Edrotes ventricosus - taxonomy confused. Much local endemism exists, and Eureka Valley may support a distinct race or subspecies.

* (correspondence with Derham Giuliani, local entomologist, and John T. Dayen, Assistant professor of Entomology, University of California, Berkeley, 1976.)

C. Ecological Interrelationships

1. Limiting Factors

Biological productivity at any given time may be limited by a single factor. For instance, if the soil contains excessive salts, plants may not be able to fully utilize nitrates. Utilization of nutrients by plants may be limited by available soil moisture. Animal production may be limited by this since many desert animals obtain their moisture from vegetation. Factors limiting productivity may change over time. If, in the ecosystem considered above, a prolonged period of rainfall occurs, harmful salts may be leached deep into the soil, resulting in less restriction to plants. Then nitrates or other nutrients may become a limiting factor. The nature of limiting factors must be known, in order to adequately assess the impacts of different uses (ICMP Environmental Analysis 1973).

The major factor limiting the ecosystem in Eureka Valley is the effect of irregular and low precipitation combined with high evaporation potentials. This results in limited available soil moisture for flora, and limited water for fauna. The period of soil moisture utilization is the period of primary production for the community and determines the supply of food available to consumers and decomposers for the entire annual cycle (Odum, 1971, Fig. 9).

Factors influencing available soil moisture are topographic postion, soil texture, and soil salinity. Higher slopes on alluvial fans and canyon floors receive most of the runoff from surrounding hillsides, resulting in a higher diversity and abundance of flora and fauna here than on the valley floor.

Fauna species in an area are determined in part by vegetation, soils, topography, climate, and water sources. As an example, the lack of trees over Eureka Valley eliminates tree-dwelling birds and rodents as possibilities in the faunal system. The sand dunes make possible the existence of specialized dune populations of insects, reptiles and other species. Faunal populations that need free water can range no farther than they can travel from open surface water.

2. Interdependence

The biota of the desert is interwoven; each organism of the web is dependent upon many other organisms. At the base is the vegetation, (see Food Web) which depends in part upon precipitation, soil characteristics and sunlight. The vitality and productivity of the vegetation

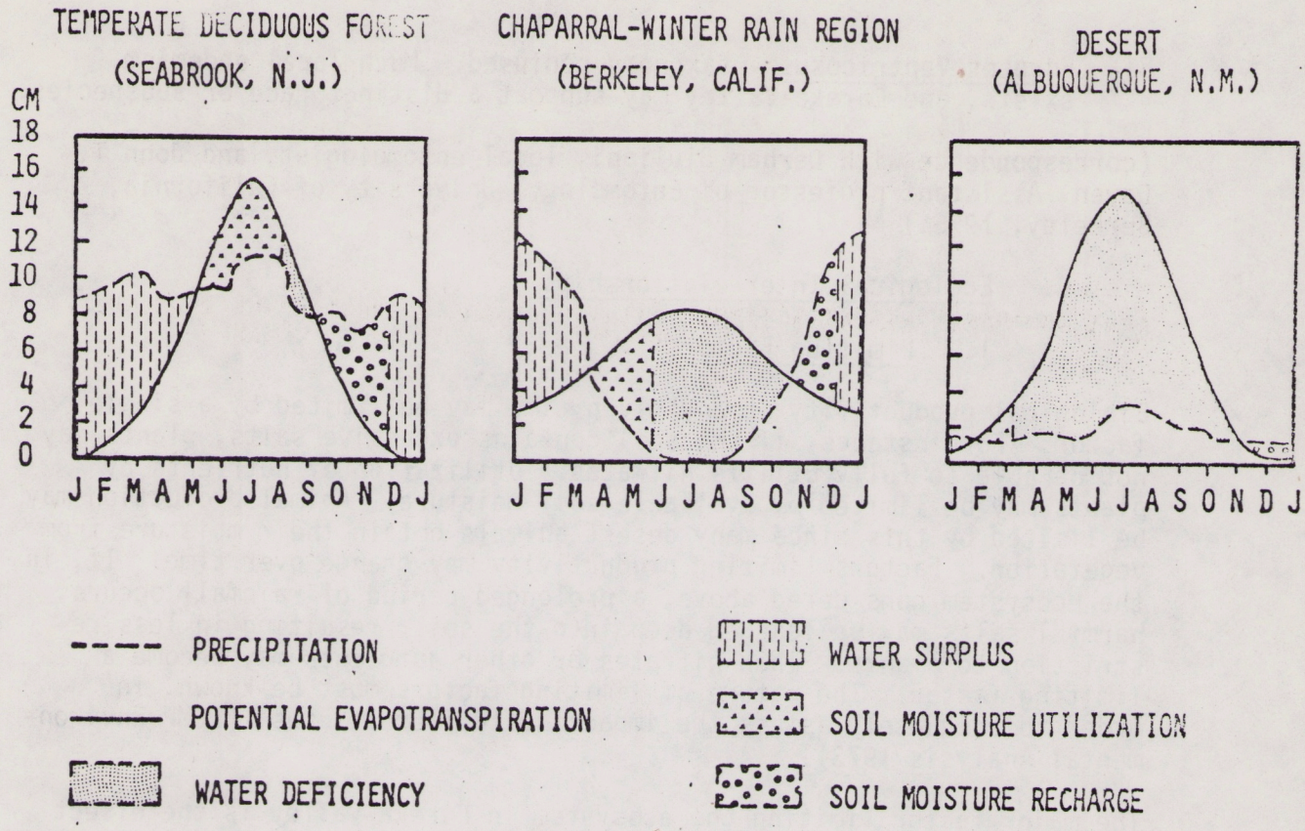
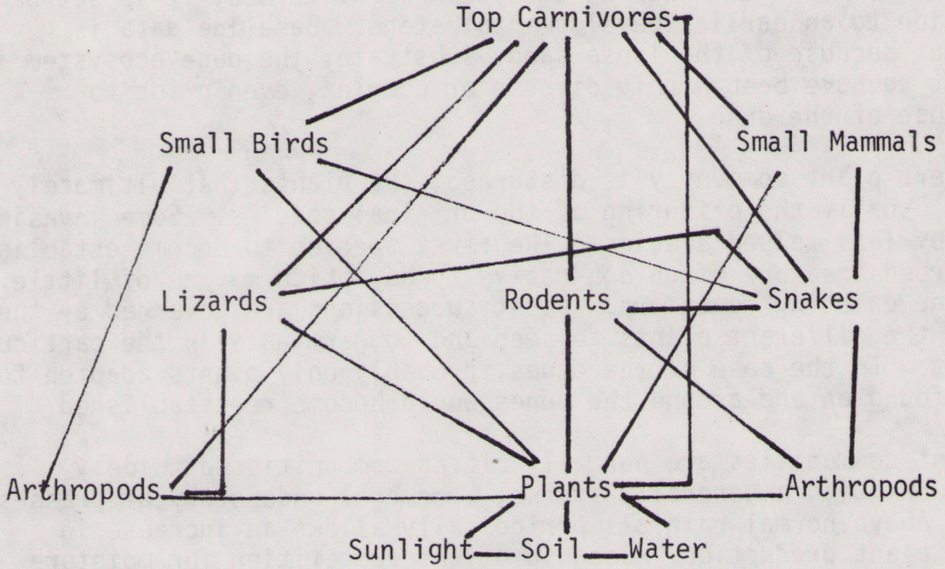


FIGURE 9: RELATIONSHIP BETWEEN RAINFALL AND POTENTIAL EVAPOTRANSPIRATION (EVAPORATION FROM SOIL PLUS TRANSPIRATION FROM VEGETATION) IN THREE LOCALITIES REPRESENTING THREE DISTINCTLY DIFFERENT ECOLOGICAL REGIONS. THE DOTTED AREA IN THE CHARTS ("WATER DEFICIENCY") INDICATES THE SEASON DURING WHICH WATER MAY BE EXPECTED TO BE A LIMITING FACTOR, WHEREAS THE VERTICAL EXTENT OF THIS AREA INDICATES THE RELATIVE SEVERITY OF THIS LIMITATION. (AFTER THORNTHWAITE, 1955.)

FROM: ODUM, EUGENE P., FUNDAMENTALS OF ECOLOGY; THIRD EDITION, (SAUNDERS CO., PHILADELPHIA, 1971)

influences the productivity of the dependent fauna and insect species. In years of sufficient rainfall, shrubs and annuals greatly increase production of seeds and vegetative mass. With an increase in food sources and with sufficient water, primary consumers increase. With the increase in primary consumers, there follows an increase in secondary or predator species after varying time lags.

Food Web



Vegetation provides food sources and protective, cooling cover for burrow entrances, nest sites and resting areas. Most rodent and reptile burrows are located beneath shrubs. Small birds nest within or beneath shrubs and trees. In turn, some species of flora depend upon insects and birds for pollination; specific plant - insect interdependencies are often found. Root mycorrhizae, mycelia of fungi which live in mutualistic association with plant roots, are present on the roots of desert plants, as in other communities (Odum, 1971). These result in a large increase in the mineral consumption of the plant.

3. Competition

Because floral and faunal species in the Eureka dunes are more numerous than would be expected in an arid habitat, there is competition among the various species for water, nutrients, shelter and space. Most niches are occupied. When certain populations become relatively abundant, other populations occupying similar niches may be out-competed and forced to emigrate or suffer population losses.

4. Succession

Every ecosystem begins the successionary cycle with few plants and animals, contains some unused niches, and is highly susceptible to disturbance since food relationships are generally simple and linear, with few potential substitutions. As the ecosystem evolves, it gains a greater diversity of organisms, with more complex interrelationships. Ecosystems trend toward a climax stage with much energy expenditure directed toward maintenance of the community rather than toward growth and successional change. When an ecosystem is disturbed, it is set back in succession to an earlier developmental stage. Baseline data is lacking, but because of the loose sandy substrate, the dune ecosystem is not thought to have been highly diverse or complex, even prior to vehicular use of the dune.

When a desert plant community is disturbed, the plants that ultimately return are usually the offspring of the original species. Some invasion may occur by less valued species. The first species to become established on a disturbed area are often non-native forbs, which may be of little value to the existing consumers. Plant successions are governed by the ability of the different plants to seed and to germinate in the particular environment. In the case of the dunes, probably only plants adapted to sand currently found on and around the dunes would become re-established.

Desert plant communities are normally closed communities of widely spaced shrubs, with a generally sparse, ephemeral understory of grasses and forbs. Above normal rainfall periodically allows an increase in herbaceous plant production. Because of the competition for moisture rather than light, growth forms are low and shrubby. Plants are widely spaced to allow room for the large root systems. Allelopathic or growth retarding substances are released by some species with the effect of inhibiting other plants from rooting nearby. Large root systems and allelopathy may prevent injurious competition for water which would result in small, unhealthy, stunted plants that might not survive excessively dry years.

When comparing the characteristics of climax or mature stages on non-extreme soil types, as contrasted with seral or developmental stages of ecosystems, the following statements can be made:

> Mature stages require very little energy to remain in equilibrium.
>
> Mineral cycles are basically closed and the nutrient exchange rate between organisms and environment is low, so nutrient conservation is higher.
>
> Internal symbiosis is more developed, leading to higher stability. High stability implies resistance of the system to external impacts.
>
> Diversity of species is high and the area is likely to be of greater visual and interpretive interest. (Environmental Analysis ICMP, 1973).

The dunes are a special ecosystem in which the first three statements apply, but less strictly because the substrate is extreme.

5. Nutrient Cycles

Cycles of nutrient exchange are not well understood in the desert. The components are known, since they are similar to those encountered elsewhere, but it is not presently possible to establish quantitative comparisons of nutrient exchange in various ecological communities.

The detritus food web breaks down organic matter from dead organisms which otherwise cannot be used directly by higher plants. Through decomposition by microorganisms, organic matter is converted to available nutrients. Ammonification and nitrification are processes, occurring during decomposition, which convert organic nitrogen compounds into forms that can be utilized by green plants. Some bacteria can capture free nitrogen from the air and make it available to plants. The two groups of nitrifying bacteria, symbiotic and non-symbiotic, each include several species. Non-symbiotic bacteria include both aerobic and anaerobic species (Environmental Analysis ICMP, 1973).

6. Dune Ecology

The dune complex supports a unique ecosystem which is tied to the rest of the valley. Insects, seeds, and other organic matter are blown into the dune complex, where they collect on the sand in wind eddies. Colonies of ants and other arthropods in the central parts of the dunes are heavily dependent upon this debris. Lizards feed upon the ants, beetles, and various insects. Snakes and birds consume the lizards. Kangaroo rats live on the dunes and feed on seeds and plants. Plants growing in the bowls and gentle slopes offer habitat and food to many of the dune dwellers. A couple of the important food plants for animals are desert dicoria and indian ricegrass. The dune grass offers essential subsurface stabilizing forces which allow desert kangaroo rats to establish burrows beneath the dune grass hummocks.

Most dune dwellers are highly dependent upon the sand for cover. They either construct tenuous burrows in the loose substrate, mostly near vegetation, or submerge themselves to various levels. The desert kangaroo rat utilizes burrows in several ways. They conserve body moisture by remaining in the cool moist burrow and store dry seeds there. The seeds collect moisture from the air, thus lessening the need for additional sources of moisture for this non-drinking creature. Lizards and snakes bury themselves from two inches to two feet beneath the surface, when non-active.

Activity patterns range from nocturnal to duirnal, with a variety of abilities to estivate during cold or hot weather. Generally, snakes, geckos, and rodents are nocturnal. Predators feeding on these are also nocturnal. The desert iquana and other lizards are diurnal, often even showing activity during the heat of the day. Various non-dune dwellers

come to the dunes to exploit the resources. These include passerine birds, ravens, prairie falcons and other raptors, kit foxes, coyotes and various other primary and secondary consumers (letter to Neil Pfulb from the staff of the U. C. Berkeley Museum of Vertebrate Zoology, September 25, 1973).

The populations of the endemic Eureka Valley evening primrose and the endemic locoweed that surround the dunes are part of the dune ecosystem intergradation into the alluvial fan ecosystems. They are important to the creatures that play a part in the ecosystem.

Ecologically, the Eureka sand dunes are important, because here evolutionary processes have occurred over thousands of years in a localized area with specific boundaries and specialized habitat requirements. These processes have perhaps been intensified, because the genepools are not extremely large and because the habitat restrictions are so stringent. Small genepools concentrate genetic differences and bring about a higher mutation rate. Harsh habitats require specific adaptive qualities in an organism. The result has been a community of highly specialized and unique flora and fauna dwelling on the dunes.

Some dune plants have developed stems that grow in spiral form, twisted by the entire plant revolving in response to wind. Others plant adaptions have occurred in response to slow covering by wind-blown sand. The Eureka dune grass grows at the tips of its stems when the rest of the plant is covered. The Eureka Valley evening primrose roots at the nodes when they are covered, and grows at the tips as well.

The fauna also has adapted to life on the windy dunes. Most notable in adaptation are the flightless insects and beetles. The characteristic of flightlessness helps prevent the insects from being blown off the dunes by the persistent winds. Another adaptation to the environment is seen in the shovel-nosed snake, which has special eyelids and nostril orifices and a countersunk jaw to prevent sand intrusion as it burrows in the sand.

Evolution is inherently a very slow process. It consists of a series of mutations (changes) on phenotypic (appearance) and genotypic (genetic composition) levels. The phenotype (appearance) of a plant may change in response to new environmental conditions; i.e. less water results in smaller leaves and shorter stature. Should conditions change back to the original, the plant will reassume the original phenotype unless long periods of time has passed. Over large regions a specific plant or animal may have variable phenotypes, but still have the same genotype, enabling the individuals to interbreed. If a population is isolated for a sufficient time period the genotype may eventually change as a result of non-destructive mutations, and the plant may become a separate species specifically adapted to its particular environment. Rapid changes in habitat, especially for highly specialized species, may fail to elicit an adaptive response and thus, the potential for extinction rather than evolution exists.

IV. HUMAN VALUES

1. Landscape Character

Human values focus on those environmental aspects having value only as perceived by humans. Landscape types are the result of natural processes and human cultural processes. Human cultural processes include any of man's alterations to the land that change its character.

Man perceives his environment through his five senses: sight, sound, smell, taste, and touch. The visual character of a landscape is the overall impression created by a combination of perceivable features, or landscape elements. These elements are perceived in terms of form, line, color, and texture.

Landscapes possessing a greater degree of visual variety are more desirable than those that tend towards monotony or sameness. The more elements present in the landscape which exert a strong visual influence or contrast, the stronger or more interesting the landscape character.

An examination of the Eureka Dunes Special Design Area shows it to posses the basic elements as follows:

Form - The dominant form is the majestic towering dune mass. Overlooking the dunes from a greater height to the east is the darker, imposing shape of the Last Chance Range.

Line - Those lines found within the subject area which influence landscape character, are a result of abrupt contrast in color (the multi layer striations in the Last Change Range) and form (the base and ridge of the dune and the skyline over the mountain ranges).

Color - Color varies with time of day, with time of year, and with weather. The element of color is usually most prominent in the vegetation, especially in the spring of a year with sufficent rainfall. Displays of an astonishing variety of color and beauty are expressed in a carpet of wildflowers in such years.

However, the predominate expression of color in the area is in the soil and rocks. The contrast from the dull brown of the valley, to the bright whitish-gray of the dunes, to the dark grey-black of the mountain ranges, to the luminous blue sky ultimately expresses color as an important element of the landscape character. A closer examination shows a detailed variation of light and dark colors within the layers of the Last Chance Range. Also, dark streaks show on the light dune surface.

Texture - While vegetative patterns usually give landscape its predominate texture, vegetation is sparse in the desert. The desert shrubs give the valley and alluvial fans a wooless texture. Erosive patterns have

worn the mountains into a harsh and rugged texture. The sand dunes have a soft, smooth texture as a result of uniformly shaped and sized sand particles.

Perception of these basic elements varies with distance, angle of observation, time of day, scale, season, and light.

The quality of the landscape is dependent upon how each feature supports the overall theme. Natural processes within the subject area result in a landscape type in which the various parts (biologic, geologic and climatic) build toward three dominant themes. The dominant themes of the subject area are those of open space, solitude and natural beauty.

A harmonious landscape has integrity and is devoid of incongruous elements. The more unity and harmony, the more complete the pleasure of the observer.

Accentuating features characterized by their dominance, add to the quality of the landscape as long as they retain a sense of harmony or unity. The dune mass is one such accentuating element of the landscape.

There are few human cultural processes, such as mining or ranching, within the subject area. The predominate human cultural process present is an ephemeral one, recreation. Recreational activities include camping, sightseeing, hiking, picnicking, photography, hang gliding, O.R.V. use, sand skiing, sand play, golf, nature study, painting, rock hounding, and relaxation. (See Appendix A for vehicle counts, points of origin, and analysis of use).

These human cultural processes affect the harmonious element or general theme of the landscape character in various degrees. The greater the alteration, be it visual, aural, tactite, or related to odor or to taste, the greater the intrusion on the landscape's character. Intrusions vary from that of sounds of machines, to those of intense camper use.

2. Socio-Cultural Interests

Socio-cultural attractions within the subject area range from archaeological sites, to the leisure pastimes one may pursue in the area, which include such activities as dune buggy driving and hang gliding.

a. Educational-Scientific

There are numerous resources within the subject area which have contributed in the past, and which have future potential of contributing, to scientific knowledge, and to the understanding of historical and environmental interrelationships and natural processes. These resources include geological, ecological, archaeological, hydrological, historical and climatological elements. Very little study, beyond identification of the values present, has been completed within the subject area. The majority of these elements are, at present, unknown to the general public, or if

known, little disturbed. However, some vandalism, collecting and ecological deterioration has occurred. No permanent developments exist within the subject area exclusive of unimproved roads.

b. Cultural Values

In some areas of the country the values of historic places, objects, and structures are important to the present day activities of subcultures. Such areas are important and of value, not because of public educational or historic interest, but because they are vital to the preservation of a subculture.

The archaeological sites within the subject area have value for public education and historic interest but are not vital to the present day activities of any subculture. Many of these sites have been disturbed through collecting and other human activities. Numerous sites lie adjacent to or outside of the Special Design boundary.

1. Ethnographic Background

The study area was historically occupied by the Western Shoshoni, who also occupied the northern halves of Death Valley and Panamint Valley, all of Saline Valley, the southern shore of Owens Lake, the Koso Mountains (Coso Range), the northern edge of the Mojave desert, and the eastern slope of the Sierra Nevada Mountains (Steward, 1938:71). Their neighbors to the north and east were the Paiutes and, to the south, the Tubatulabal and Kawaiisu.

The basic social and economic unit of the Shoshoni was the family. Families aggregated for communal rabbit and antelope drives. They also lived in communal villages in the winter. Plant collecting was the main subsistence pattern, with hunting carried on as an adjunct. Women did most of the collecting while men hunted large animals such as deer and mountain sheep. Both sexes hunted small game, including rodents and lizards.

According to one informant (Steward, 1938:72) pine nuts were the most important food source. These were collected in the fall and stored for use throughout the winter. Small quantities were transported to winter villages which were usually located near the mouths of canyons, at the base of the mountains. One winter village was reported by Steward (1938:79) as probably being located at Waucoba Spring. This was probably the main village of the Western Shoshoni group that occupied the territory between Saline and Eureka Valleys.

When the supply of stored food was exhausted, about March or April, families left the winter villages to procure vegetal food. They also hunted rabbits and antelope. This may have been the time of year at which they went to Eureka Valley. Steward reports (1938:79) that the valley contained important quantities of "sand grass" (Oryzopsis) and another unidentified grass (maybe the dune grass). He states that

"water was obtained from a well near the sand dunes." Summer was spent gathering seeds as they became available in the mountains. In the fall, communal rabbit hunts were held and the pine nut harvest began.

The above is an idealized seasonal round. Resources were highly variable in density and abundance from year to year. Communal activities could only occur in years when the food resources could support aggregations.

Property ownership was limited to the products of one's own labors. Natural resources were free to anyone. "Women owned their baskets, clothes, and other objects used by them, while men owned hunting equipment and things peculiar to their sex. The household owned the house, foods and general equipment (Steward, 1938:253)." Large game was the only exception. The hunter could keep the skin and some choice part, but the rest was shared with other members of his village.

There were two types of leaders - one acted as a rabbit drive director and the other presided over festivals (Steward 1938:76).

In summary, the Western Shoshoni pursued a hunting and gathering existence where plant collecting was of primary importance. The basic socio-economic unit was the family. Families aggregated together for communal activities when resources permitted.

2. Prehistoric Background

The following summary of Great Basin archaeology was taken from Hall and Barker (1975).

A pre-projectile point culture has been hypothesized for the Great Basin. However, at the present time this is not well-documented nor generally accepted by the archaeological community. From 10,000 B.C. to 6,000 B.C. cultural activities were probably characterized by a generalized subsistence pattern focusing on the margins of pluvial lakes.

A hypothesized warmer and drier climate between 6,000 and 4,000 B.C. may have resulted in partial abandonment of low-lying areas for more attractive resources at higher elevations. By 4,000 to 3,000 B.C. the basic food collecting life-style was established that persisted into historic times. During this time food processing tools such as manos, metates, mortars and pestles appear. Possibly as early as 2,000 years ago the bow and arrow appeared. This is shown archaeologically by a change to lighter points from the heavier dart points.

3. Archaeology

Figure 1 (Fig. 10) from Hall and Barker (1975) gives a basic sequence for the southwestern Great Basin. While evidence from the study area, is sketchy some of the time-sensitive projectile points have been collected in the study area. Silver Lake and Lake Mojave points were observed by the author in a private collection. Other point types reported for the

Figure 10

Figure 1

CULTURAL SEQUENCE

	Southwestern Great Basin	Local Phase Name	Diagnostic Artifacts
	LATE PREHISTORIC	Early Mohave Death Valley IV Early-Late Cottonwood Marana	Pottery Cottonwood points Desert Side-Notched points
1000	ROSE SPRING/ EASTGATE COMPLEX	Amargosa II Death Valley III ? Late Rose Spring Hoiwee	Rose Spring points Eastgate points
AD BC 0	GREAT BASIN	Early Milling,	Grinding tools
1000		Archaic Transition	Elko points
		Little Lake and Newberry	Gypsum Cave points
2000		Early-Middle Rose Spring	Pinto /Little Lake pts
		Death Valley II	Humboldt points
3000	ARCHAIC		
		Pinto Basin	Silver Lake points
4000			
5000	scanty occupation ?	none definite	Silver Lake points ?
6000			
7000	WESTERN PLUVIAL LAKES TRADITION	Western Lithic Co-Tradition Death Valley I Lake Mohave Complex San Dieguito Complex	Silver Lake points Lake Mohave points Crescents /Transverse points
8000			
9000	FLUTED POINT TRADITION ?	Fluted Co-Tradition	Folsom points ? Clovis points
10000	PRE-PROJECTILE POINT CULTURES ?		choppers teshoa flakes scraper planes

from Hall and Barker (1975)

study area include: Desert side-notched, and Pinto points (Rollin and Grace Enfield, personal communication, 1976). Hanks (1973a) mentions what were probably Elko points, and a crescent, found on the north playa edge. Clearly, even from this scanty evidence, occupation in the area may well date from 7,000-8,000 B.C. until historic times.

4. Archaeological Reconnaissance

One archaeological site, INY-1564 was recorded near the study area prior to field work. Numerous other sites were reported, but none was officially recorded. Prior to field work, information was obtained from the Desert Planning Staff, Bureau cultural resources files, and Mr. and Mrs. Rollin Enfield, archaeologists familiar with the area. Field reconnaissance was concentrated within one-half mile of the northern one-half of the sand dunes in the lower elevations of the proposed open area. Only the edges of the sand dune were surveyed, as previous surveys in the dunes proper had yielded no cultural resources. A five-day field reconnaissance was carried out on foot by the District Archaeologist, assisted by the Bishop Area Manager, who is familiar with cultural resources.

As estimated 80% of the area surveyed contained cultural artifacts, ranging from dispersed scatters of flakes to dense concentrations of flakes and tools. Probable aboriginal irrigation ditches were recorded. These were originally reported by Richard Patch in 1950 and have been examined by others, but had never been recorded.

Site boundaries were drawn on the basis of density and abundance of cultural materials and on the basis of differences in artifacts, where two or more sites are contiguous. An in-depth, systematic survey would be necessary to identify the boundaries more precisely. All areas called sites for the purposes of this report contained an estimated minimum density of ten flakes per square meter. Archaeologically sensitive areas are shown in Fig. 11.

5. Results

The recorded archaeological sites are discussed below:

INY-1564, located on the southwest side of the playa, is reported to be a major occupation site containing numerous projectile points, trade beads, shell beads and house rings. The site was not relocated by Hanks and Conrad in 1973. This site was not visited during this survey. It is located in an area currently closed to vehicle access.

EV-1 is an extensive scatter of flakes, flaked stone tools and fire affected rock extending along the north edge of the sand dunes, covering over 500 square meters. The area has received some impacts from recent camping and vehicle use.

EV-2 is a small, dense scatter of approximately 500 flakes, located on a gravelly rise above a blowout at the northeast end of the dune. The

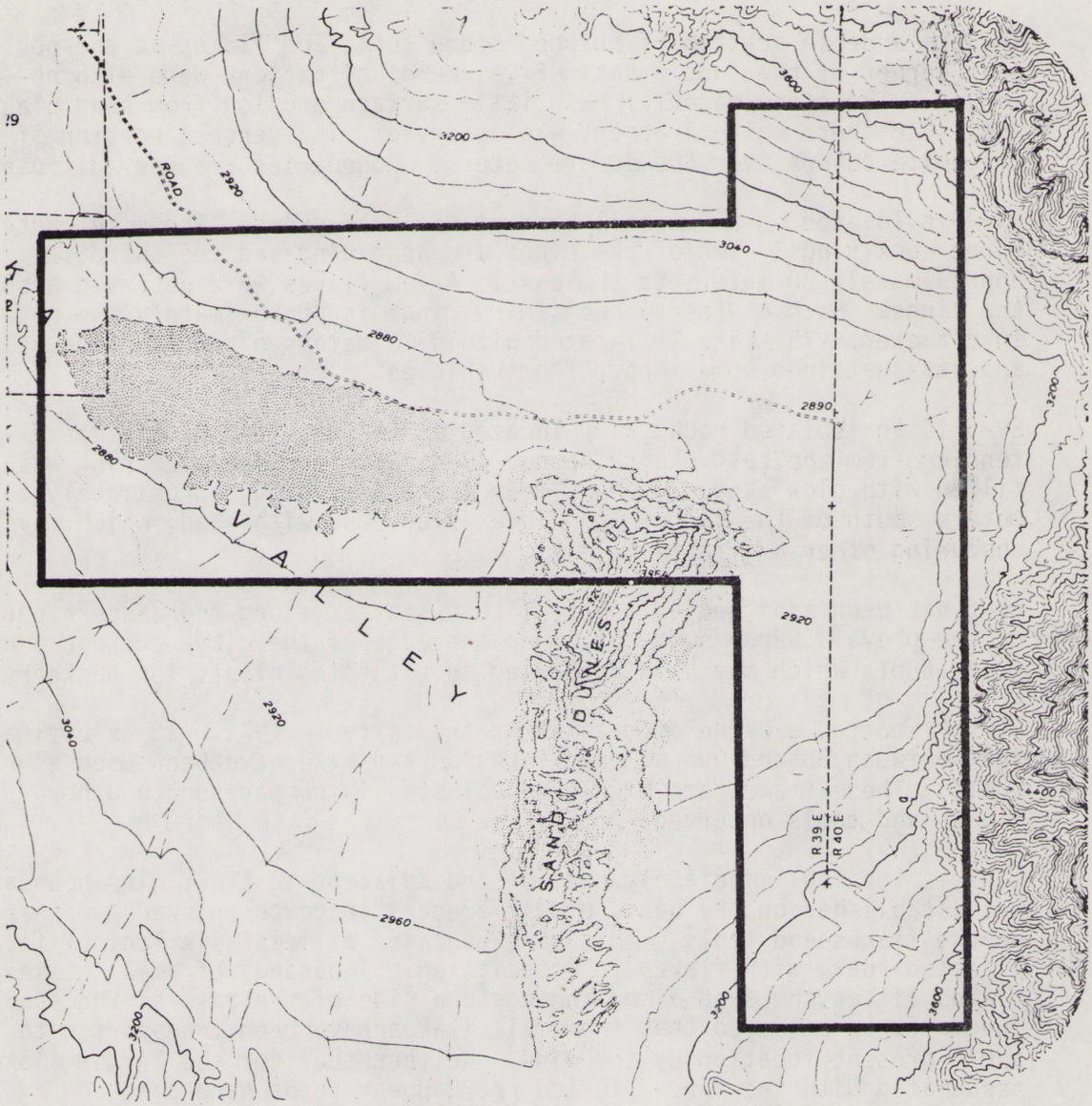


Fig. 11. Proposed Eureka Valley Archaeological District

stone material appeared to be non-utilized flakes of which 80% were obsidian and 20% were a grey-green chert-like material.

EV-3 is a dense scatter of chipped stone tools and flakes at the northeast corner of the sand dunes. Five sherds of pottery were also observed. The stone material has little surface erosion from sand blasting. One chert knife fragment was observed. The densest portion of this site covers over 500 square meters. Boundaries are very diffuse.

EV-4 is located on a low hill east of the sand dunes. The site contains three rock rings. Two of the rings are adjoining and the third is approximately 20 meters to the east. A few flakes were observed around the rings. Each of the two adjoining rings is approximately two meters in diameter. The site is located within 20 meters of an existing road and has sustained some impact from vehicles.

EV-5 is an isolated rock, ring located on the west end of a ridge extending from the Last Chance Range. The two meter-diameter ring was filled with blow sand. One obsidian flake was noted approximately 50 meters south of the ring. The ridge is covered with sand, which may be obscuring other artifacts.

EV-6 has been assigned to a vast lithic scatter along the eastern edge of the playa. Sandy hummocks along the edge of the playa contain small flake tools which may have been used in gathering plants for basketry.

Hanks reported a cache of metates at this site in 1973. It is estimated that between 80 and 90% of the flakes on the site have been used as tools. These flakes are highly sandblasted in comparison to other flakes and tools observed in the area.

EV-7 is located immediately east of and adjacent to EV-6. The boundary was established on the basis of differences in components and weathering on the flakes and tools. This site contains at least six loci of fire-affected rock, with flakes in association. Thousands of small obsidian flakes litter the sand along the western side of the base of the sand dune. It is believed that the small flakes have been transported to their present location by the wind. Neither they nor the larger flakes associated with the fire-affected rock appear to be sand blasted.

EV-8 is the most highly disturbed site recorded. It is located in the most frequently used camping and staging area for dune recreationists. Numerous modern campfire rings and vehicle tracks are on the site. The flake scatter is comprised primarily of non-utilized obsidian and chert flakes.

EV-9 has been assigned to the proported aboriginal irrigation ditches located on the eastern side of the playa. These ditches were first reported by Patch (1950). At that time a main ditch, a feeder ditch and three parallel ditches taking off at right angles from the main ditch, were visible. Hanks observed the main ditch and feeder ditch in 1973. He stated that two of three parallel ditches were barely visible then.

Clough's on-the-ground observations in 1976 could only locate the main ditch and feeder ditch. However, during an aerial reconniassance flight on May 25, 1976 the lateral ditches reported by Patch were observed from an altitiude of approximately 8,000 feet.

While natural cracks do occur in the playa surface, the regular alignment of these ditches, and their straightness, leads archaeologists to believe they are man-made. Irrigation of wild plants is reported by Steward (1938:53) for the Owens Valley Paiute.

It is evident from all accounts of the Eureka Valley area that aboriginal occupation has occurred over a long period of time. Steward (1938:79-80), in fact, mentions the extensive archaeological remains. He notes "spherical stone mortars of the type commonly used by the Shoshoni for grinding mesquite." He mentions a lack of pottery. Mr. and Mrs. Enfield stated that they have only found pottery on the eastern side of the dune. This is true for the present survey. Pottery occurred in late prehistoric times in the Great Basin and is indicative of more recent occupations than are represented by some of the other artifacts.

6. National Register of Historic Places

The National Register Criteria 36 CFR 800.10 were applied to the district encompassing the sites described previously. It is felt that this area is best represented as a district, as it is the significance of all the sites taken as a whole, that qualifies the area for nomination to the National Register of Historic Places.

The proposed Eureka Valley Archaeological District boundaries are drawn on Fig. 11 to conform to the UTM grid system. The boundaries were established to encompass only those areas containing known cultural resources. Boundaries should be revised and updated as new information becomes available.

The District appears to qualify for nomination under 36 CFR 800.10(a)(4); "districts that have yielded, or may be likely to yield information important in prehistory or history." This district has a potential to contribute valuable information in at least three research areas in archaeology; human adaptation to arid lands, human adaptation to climatic changes, and the study of prehistoric agriculture in the Great Basin and California.

In compliance with the Historic Preservation Act of 1966 (80 Stat., 915, P. L. 89-665), Executive Order 11593, and 36 CFR 800, any undertaking that may have an effect on cultural resources which may qualify for nomination to the National Register of Historic Places must be submitted to the Advisory Council on Historic Preservation for review and comment. Initially, BLM must submit documentation to the State Historic Preservation Officer for his concurrence on our application of the National Register Criteria, and for his agreement with our findings of impact by whatever the final recreation proposal will be.

c. Social Welfare

The most significant flow and distribution of money, goods, and services within the subject area is a result of recreational pursuits. Most recreationists travel from communities within the Owens Valley and Mammoth Area. While there are no services within these communities entirely dependent upon the recreational activities occurring at the Eureka Dunes, some benefits are received by the appropriate businesses. Motorized recreation contributes the higher percentage of economic benefits. Quantified data is unknown.

Currently, the use demand appears to be divided between motorized recreation vehicle activities and non-motorized recreation activities. Over time, motorized recreation tends to displace some other recreational activities. This has been documented in several areas and discussed by Badaracco (1976). Letters to the Bakersfield District BLM have indicated that former dune users no longer return to the dunes because of their feelings about ORV use. (File available for review, Bishop Area Office, BLM).

Recreation is very important to the American citizen. The ever increasing amount of leisure time and discretionary income available is causing some profound changes in the American lifestyle. This is evident in the fast-growing recreation business. In California the increase in recreational activities has been channeled, at a generally increasing rate, into the off-road vehicle.

The sale of off-road vehicles has increased from 7 percent to 9 percent per year since 1969 (Honda et. al 1973). There are an estimated 1.8 million motorcycles (M.O.R.E. 1973), 650-750 thousand four-wheel drive vehicles and an undeterminable number of reconstructed vehicles (dune buggies) in the State of California. Nearly 15 percent of California's population own or have access to an off-road vehicle.

Statistics relevant to four-wheel, off-road vehicles are incomplete, due to registration inconsistencies. Approximately 87 percent of all registered off-road vehicles in California are motorcycles, and only 11 percent are four-wheel vehicles. This does not represent the total RV picture, simply because, until 1971, with the enactment of the Chappie Z'Berg Act, non-street, legal RV's were not required to be registered. Also, most four-wheel drive vehicles that are legal for street use are registered as stationwagons to reduce registration fees.

Membership in recreational vehicle clubs and associations is increasing from 15 to 20 percent per year (Edwards 1973) or roughly at double the rate of the ORV recreational activity. This rapid growth is partially a result of the increased need to make ORV recreationists' desires known to legislative and land management agencies. There are also obvious social benefits.

Unfortunately few studies exist that might hint at future demands, based on simple desire for RV recreation. Many recreation planners feel that a physical and psychological need is being met through RV activity. Others feel it is simply a fad that will soon disappear.

In southern California, recreational activities revolving around off-road vehicles have grown much faster than elsewhere in the U.S. This is probably due to the availability of vast expanses of public land relatively near large metropolitan areas. If all economic conditions and the availability of use areas were to remain constant, the growth of the popularity of RV's for recreational purposes would probably continue to grow, at least in the short run. (Riverside District Office, BLM, 1974).

The planned paving of the Eureka Valley Road into Death Valley National Monument may change the amount and type of recreational use at Eureka Dunes. This would affect the welfare of surrounding service-providing businesses, mostly in the Owens Valley, by bringing increased activity to the area.

Social welfare from recreational pursuits extends beyond the flow and distribution of money, goods,and services. Recreation contributes to the health and welfare of the general public. The enjoyment of the out-of-doors, the relaxation and the spiritual refreshment to be found in recreation can not be measured in material terms.

d. Attitudes and Expectations

Diverse and polarized attitudes and expectations exist (Badaracco, 1976; BLM letter files, Bishop) concerning the Eureka Dunes. There are those (vehicle enthusiasts and non-vehicle users alike), who have been using the dunes for years with no restrictions or controls. They stongly resist restrictions on their pursuits and activities. They feel public land is being closed to them. A frequent complaint is that there is no place left to pursue their leisure time activities and life styles.

Others feel that the area is being damaged by uncontrolled use. They feel the area possesses unique features worthy of protection. They object to ORV use impacting the ecology of the area and disturbing other non-ORV leisure activities.

e. Local Regulatory Structures

The Eureka dunes area is included in the Inyo County General Plan. It has been identified by the Inyo County Planning Commission as a natural reserve because of its unique features. The Inyo County Sheriff Department is responsible for enforcement in the rural areas of the county, and the Inyo County Road Department has responsibility for maintenance of the major access road to the subject area.

The air quality would not be harmed on a long-term basis by this alternative. The dune geology and the playa surface would not be harmed on a long-term basis, nor would the long-term productivity of the lake sediments be significantly harmed.

If ORV use continued or increased commensurate with estimated increases for the total desert, the Endangered Eureka dunegrass could be exterminated on the south half of the Eureka Dunes, leaving the population on the north half and a marginal population in Marble Canyon. If those populations were not sufficient to maintain the species, the dunegrass could become extinct in the wild. The four known endemic dune beetles could also suffer a population loss on the south half. The ecosystem would be greatly impaired and changed on the south half.

The short-term use for vehicular recreation would destroy some dune-margin archaeological remains that may be present, eliminating them from future scientific study and public interpretation.

C. Irreversible and Irretrievable Commitments of Resources

If the gene pools and water supplies of the dunegrass and endemic beetles were sufficient to maintain these species on the north end and in Marble Canyon, these would not be irreversibly committed. If they were not large enough, and the populations declined, then these organsims could be irreversibly committed.

Any cultural resources damaged or destroyed would be a permanent commitment of resources. These archaeological remains cannot ever by replaced or reconstructed.

Eureka Valley flower moves from endangered to threatened status

Impacts to the plants from off-road vehicles have been virtually eliminated

Register Staff 3-3-2018

Based on successful management of the Eureka Dunes, including reduction of significant threats from off-highway vehicles, the U.S. Fish and Wildlife Service is delisting Eureka Valley evening-primrose and is downlisting Eureka dune grass from endangered to threatened.

Both plants were listed as endangered in 1978, due primarily to impacts of off-road vehicle and other recreation activities. The Eureka Dunes were initially managed by the Bureau of Land Management, which closed off-road vehicle use in 1976. Other management actions taken by BLM included increased ranger patrols, monitoring and environmental education.

In 1994, the passage of the California Desert Protection Act transferred the land to the National Park Service as part of Death Valley National Park. The portion of the park where the plants are found is now designated as a wilderness area, and impacts to the plants from off-road vehicles have been virtually eliminated.

The park has taken additional management actions as part of its ongoing efforts to conserve Eureka dune species. Eureka Valley evening-primrose is a perennial. It produces clusters of flowers that are white fading-to-pink. Flowers appear through the spring and summer months as long as conditions are favorable. This species of evening primrose is pollinated by hawkmoths, butterflies, and bees. The final rule, Post-Delisting Monitoring Plan for Eureka Valley evening-primrose, and other supporting information is available online at www.regulations.gov. In the Search box, enter Docket No. FWS-R8-ES-2013-0131.

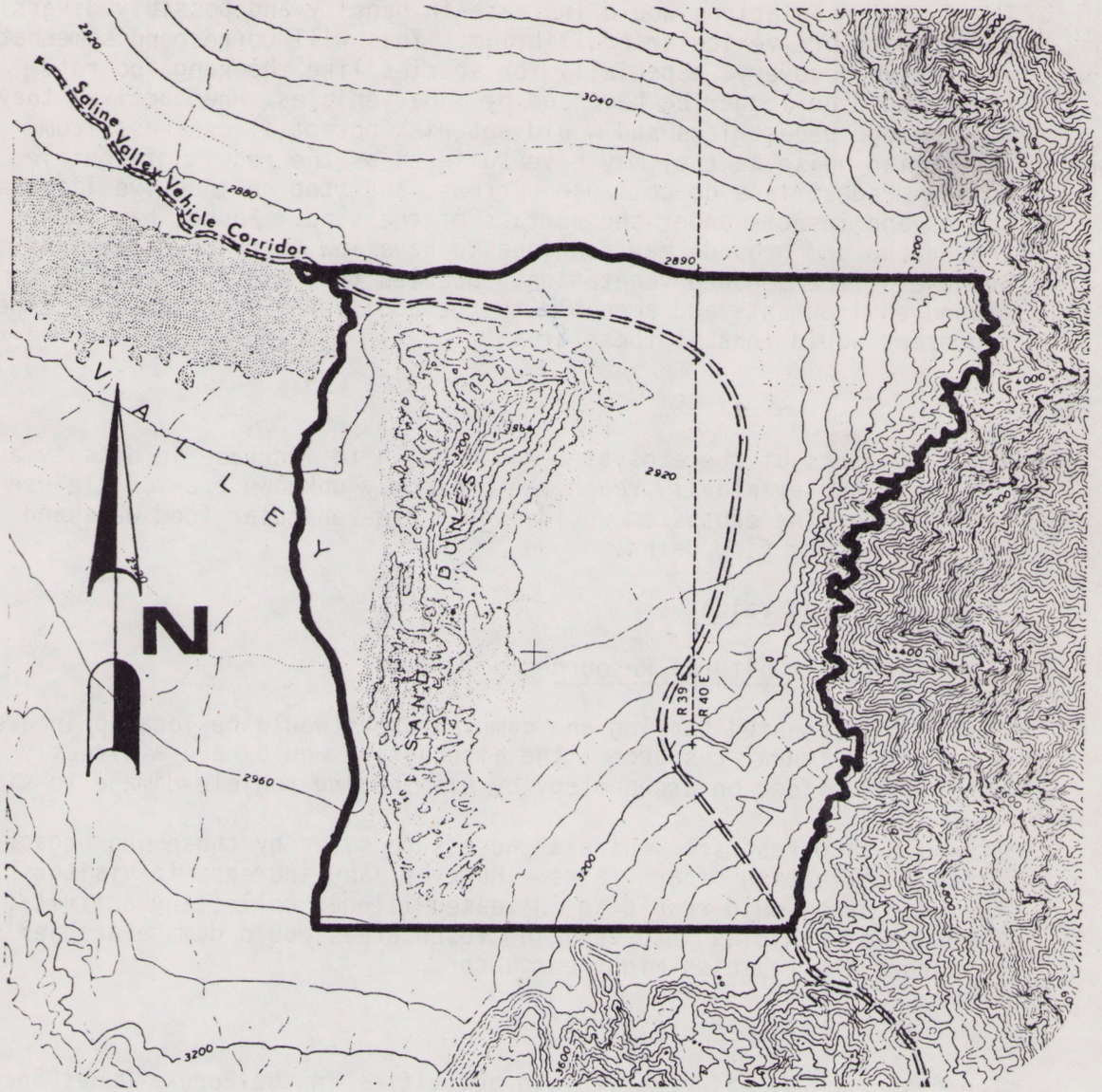


Fig. 15. Alternative C (Outstanding Natural Area)

Recreation, Non-Vehicle

Special Design Boundary

Use Area Boundary

Fauna

The faunal populations would increase in density and possibly diversity to approach pre-vehicular equilibrium. This will correspond somewhat to vegetative recovery, especially for species like the kangaroo rat. Fauna would no longer be harassed by dune vehicles. When active, they would dodge pedestrians and would not risk potential deafness from pedestrian noise as they may have suffered as the result of vehicle noise. Pedestrians do collapse burrows, and step on inactive lizards, snakes and insects under the surface of the sand. Faunal habitats around the campgrounds may continue to have low carrying capacities because of the denuded vegetation. Species that are adaptable to campground environments and amenable to the additional food sources campers represent would inhabit these areas.

Ecosystem

The components of the ecosystem would begin to increase in density and diversity and eventually reach the presently unknown pre-vehicle use equilibrium. The ecosystem would regain pre-vehicular food webs and relative energy flow paths.

Human Values

Cultural Resources

Assuming designated parking and camping areas would be located in areas devoid of cultural resources, the alternative would have a directly beneficial effect on archaeology by eliminating vehicle damage to sites.

It would also restrict vehicular access to sites by those who engage in illegal collection of artifacts. However, any increase in visitors to the dune area could result in increased illegal collecting activity. Trespass of vehicles into vehicle Closed areas would damage archaeological resources the vehicles might encounter.

Social Resources

The cessation of off-road vehicle activities in the Eureka Dunes Special Design Area could cause a slight decrease in the amount of recreationist money flowing into the Owens Valley. However this decrease might be offset by increases in numbers of non-ORV dune activities.

Conservationists and scientists will be pleased that the unique Eureka dunes will be protected. Vehicle enthusiasts would lose a vehicle area which is convenient to the dune enthusiasts of the Owens Valley. The ORV enthusiasts would be displaced to another area or denied their recreational pursuits.

The area would support a range of multiple uses, from various pedestrian activities to scientific research. These uses should not have serious inherent conflicts. Pedestrian safety would no longer be endangered by dune vehicles.

Management Resources

A Recreation Management Plan would be developed for the Special Design Area. Management would be needed to develop and maintain sanitary and camping facilities and interpretive displays. Rangers might have to patrol heavily during the first use season to enforce the closure, until dune vehicle enthusiasts realize that the decision is being enforced. They then would probably cease coming to the area, and enforcement intensity could lessen.

2. Possible Mitigating or Enhancing Measures

a. Post the boundaries of the vehicle use areas to indicate the location of the "Closed to Vehicles" areas. This should help to protect the habitat in the closed areas.

b. Designate primitive parking and campground areas and their boundaries, to prevent these activities from spreading all along the base of the dunes.

c. Develop sanitary facilities, place garbage cans, and develop a maintenance schedule.

d. Develop an interpretative center to explain the natural features of the dune ecosystem and ways in which recreation impacts the ecosystem. Include a display asking for thoughtful and conservative behavior.

e. Establish and monitor additional photo trend plots and vegetative study transects both on and around the dunes. Establish and regularly monitor faunal population trend study transects.

f. All designated camping and parking areas should be intensively surveyed for cultural resources prior to designation. Areas selected should be devoid of cultural resources. Carefully worded interpretive signs should be used to discourage the illegal collection of artifacts and help to increase public appreciation of the cultural environment of the study area.

g. Establish a flexible ranger patrol program for the Special Design Area to encourage compliance with the management plan.

3. Recommendations for Mitigation or Enhancement

All of the above measures are recommended.

4. Residual Impacts

The varied pedestrian activities will have some negative impacts on the flora and fauna and the dune ecosystem carrying capacity, especially in and around the campgrounds and parking lots to be designated in the Recreation Management Plan.

Residual impacts of the proposed action in terms of archaeology should be minimal. However, any human use of the area leaves room for the possibility of vandalism to archaeological sites from illegal collection, and the vehicular trespass activities of those who do not wish to follow the management plan can cause irrepairable damage to cultural resources. Net residual impacts of the plan cannot be completely determined at this time.

B. Relationship Between Short-Term Use and Long-Term Productivity

Short-term use would be defined as that time within which recreation occurs on the dunes. This period would end if the dunes were ever closed to recreation in the future. Long-term is that time in which subsequent effects of the recreation will still impact the environment.

Long-term productivity of the flora and fauna should not be adversely affected by the short-term use for pedestrian recreation. The alternative should be adversely impact the quality and quantity of the ecosystem's long-term productivity.

The short-term use of the area by people for recreation and/or research may have some effect on the archaeological resources. Even removal of archaeological remains for scientific study constitutes destruction of the resource, by making it unavailable for on-site study in the future, when more sophisticated methods of extraction and analysis may be developed. Any use that destroys or damages any portion of the site decreases the long-term productivity of these sites in terms of the scientific information they can yield and the interpretive potential they contain.

C. Irreversible and Irretrievable Commitments of Resources

There will be some individuals of the floral and faunal communities that will be irreversibly and irretrievably committed by this alternative, but less damage and destruction to these communities will result from this alternative than from the alternatives allowing vehicle use.

Any activity that will damage or alter cultural resources will eliminate some fragment of scientific data. As long as the destruction is minimal the commitment of archaeological resources will be minimal. However, these resources are completely non-renewable. The archaeological remains that occur in the study area cannot be reconstructed. Any loss of archaeological data is a permanent, irreversible and irretrievable loss.

BAKERSFIELD DISTRICT
MULTIPLE USE ADVISORY BOARD
MEETING AND TOUR JULY 23 - 24, 1976
AGENDA

Friday - 23 July

8:00	a.m.	Depart Bakersfield from Federal Building
11:00	a.m.	Lunch in Lone Pine
1:30	p.m.	Arrival at Eureka Valley Sand Dunes
		At completion of Dunes tour Board will depart for Westerner Motel, Bishop.

Saturday - 24 July

9:00	a.m.	Chairman Homer Harrison convenes Board meeting at conference room of Bank of America, 536 N. Main St., Bishop.
9:05	a.m.	Remarks by Acting District Manager, Terral King.
9:10	a.m.	Slide and talk presentation on Eureka Dunes by Bishop Resource Area staff.
9:40	a.m.	Presentations by the public on Eureka Valley Dunes and Advisory Board rechartering.
12:00	Noon	Lunch
1:00	p.m.	Chairman Homer Harrison convenes Board meeting at conference room of Westerner Motel, 150 E. Elm St., Bishop.
		Board will consider resolutions relative to Eureka Valley Dunes and rechartering.
		At conclusion of afternoon meeting Board will be transported back to Bakersfield.

U. S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
BAKERSFIELD DISTRICT OFFICE

APPROVED BY Lewis A. Ball

Bureau of Land Management
Bakersfield District Manager

ALTERNATIVE E: RESEARCH BY PERMIT

Management Program

Under this alternative the BLM would manage the Special Design Area for the sole purpose of scientific study and research. The area would be dengnated as a Research Natural Area (43 CFR 6225) and only scientific research that would not be repetitive, or cause significant harm to the dune ecosystem would be allowed by permit. All other uses would be restricted (Fig. 17).

Significant Aspects

This alternative would emphasize those values that could be attained by scientific research on and around the Eureka Dune system. Considerable public interest has been expressed concerning the flora, fauna, geologic, and hydrogeologic attributes of the Eureka Dune system. Opportunities also exist for archaeological research. In all, the Eureka Dunes and the surrounding area represent a unique and valuable scientific resource, which would be protected from adverse impacts from all other human activities by the implementation of this alternative.

Management activities by the BLM could be expected to increase under this alternative, particularly in administration of the permit system to ensure resource protection from possible large numbers of research projects and in efforts to enclude all but researchers. Research on the two Endangered plants will fall under the proposed General Permit Procedures and Endangered and Threatened Wildlife and Plants published in the Federal Register, Vol. 41, No. 110 June 7, 1976.

1. Anticipated Impacts

Air

Researchers travelling by automobile to the Eureka Dunes research area would contribute insignificant amounts of pollution to the air basin.

Geology

The dune integrity would not be adversely affected by research under permit. Playa, lake sediment, and alluvial fan integrity would not be adversely impacted to any significant degree. Compaction and permeability tests might be carried out, but not over wide areas.

Flora

No adverse impacts will occur from research on the Special Design Area. Beneficial recovery from vehicles of the flora will occur over time. Over-collecting is a possibility.

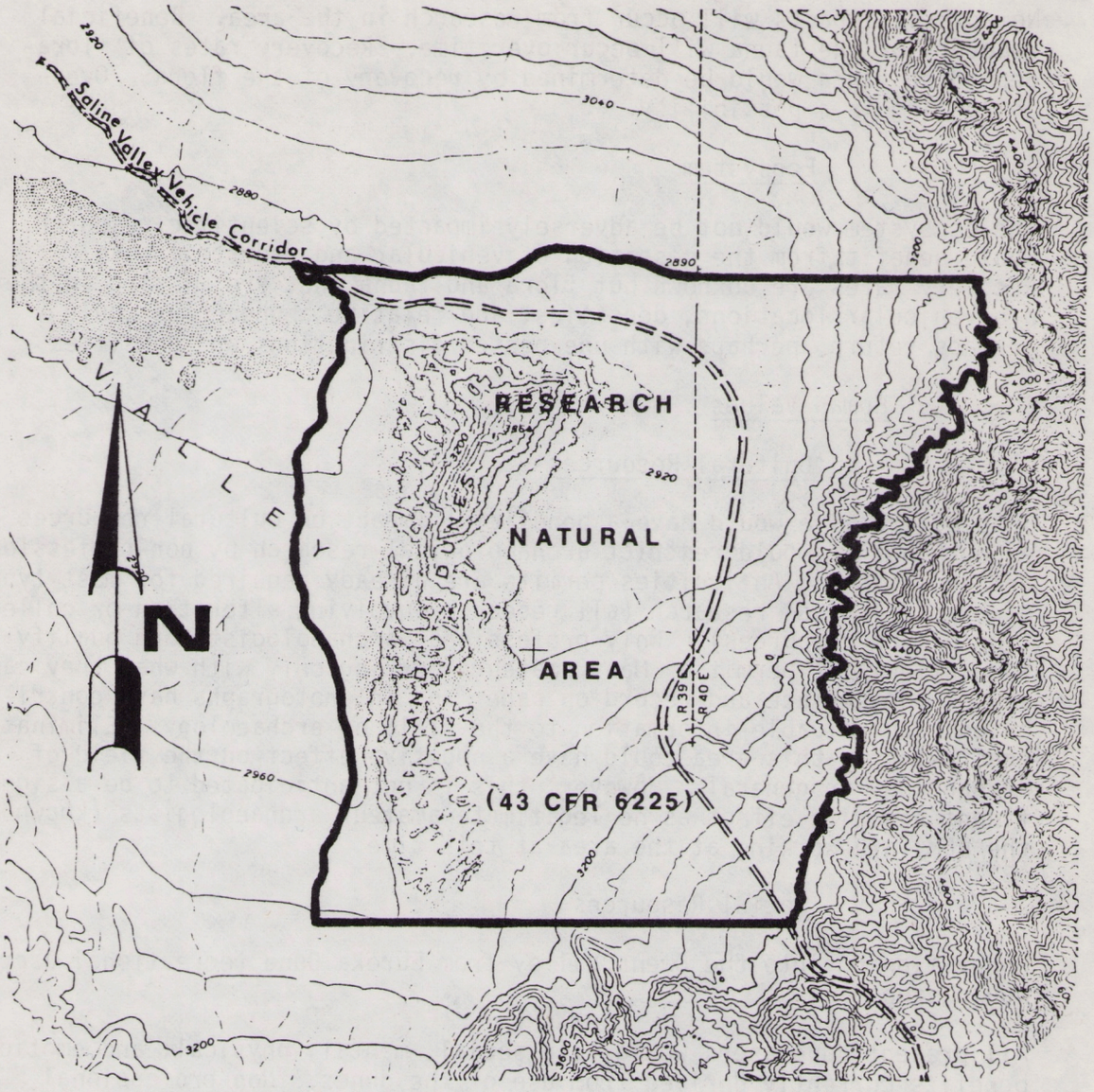


Fig. 17. Alternative E

Research By Permit

Special Design Boundary

Use Area Boundary

Fauna

No adverse impacts will occur from research in the area. Beneficial recovery of the fauna will occur over time. Recovery rates of flora-dependent fauna would be determined by recovery of the flora. Over-collecting is a possibility.

Ecosystem

The ecosystem would not be adversely impacted by scientific research. It would benefit from the cessation of vehicular and pedestrian use. Recovery rates are unknown but flora and fauna that are missing in their pre-vehicular locations, densities, and relative abundancies would perhaps return, perhaps with unexpected distributions and densities.

Human Values

Cultural Resources

This alternative would have a beneficial impact on cultural resources except that it would restrict archaeological research by non-professional archaeologists. Antiquities permits are already required for most types of archaeological research (all research involving alteration or collection of the resources). Only professional archaeologists can qualify for antiquities permits. Many amateurs working only with what they can see on the surface and record on paper and in photographs have contributed much valuable information to the field of archaeology. Eliminating their work in this area could have a negative effect on the field of archaeology in general. However, this is not anticipated to be a significant negative effect as no legitimate amateur archaeologists (known to the BLM) are working at the area at this time.

Social Resources

Money flowing into the Owens Valley from Eureka Dune recreational users would stop.

All present dune users would lose social, mental, physical, and emotional benefits currently derived from use of the dunes. Non-professional scientists would not be allowed to study the dunes. Conservationists would probably be pleased that the dunes are protected, but upset that they would not be allowed to enjoy them. Vehicle enthusiasts would be irate. All other users also would be upset. The recreation resource offered by the dunes would not be utilizable under this alternative. However, research under undisturbed conditions would contribute to mans knowledge of genetics, adaptablility, dune ecology, native American history, and other subjects.

Management Resources

Management would involve initiating and administering the permit system and enforcing of the closure. Trespass would occur, ranging from

casual use in innocence of the full meaning of the signs, through use in the belief that the closure "must apply to someone else, not me, I don't hurt the dunes," to vindictive destructive trespass in revenge, examples of which currently occur when Bureau signs are destroyed.

2. Possible Mitigating or Enhancing Measures

a. Post the boundaries of the Vehicle Closed area.

b. Establish a review board composed of members of the scientific community and Bakersfield District BLM employees to determine the relative suitability and environmental impact of each proposed project, prior to issuing a permit. The board would review research plans and attempt to insure that no two scientific studies duplicate data or in any way interfere with each other, or with the integrity of the dune ecosystem.

c. Amateur archaeologists could be granted special permits to observe and study in situ (on the ground) the archaeological remains of the Eureka Dune area. This would allow these people to study the archaeological materials without disturbing or destroying them. Careful control would have to be maintained to assure that the permits were being utilized properly and not as licenses to collect.

d. Amateur scientists, self-trained botanists, biologists, etc., could be granted special permits to conduct research in the area.

3. Recommendations for Mitigation or Enhancement

All of the above possible mitigation measures are recommended.

4. Residual Impacts

No adverse residual impacts should occur under this alternative.

B. Relationship Between Short-Term Use and Long-Term Productivity

The short-term use would be defined as that time in which the research occurs on the dune area. This period would end when each project finishes and collectively when the research permits are no longer issued and all studies have been completed. Long-term productivity relates to that time in which residual effects of the research would still impact the environment.

There would be no lessening of the dune productivity as a result of research projects permitted by the Bureau.

C. Irreversible and Irretrievable Commitments of Resources

No resources will be irretrievably or irreversibly committed as a result of this alternative, unless permits are issued to excavate archaeological sites. If this occurs, there resources will be irretrievably committed, but compensative benefits will accure in the form of additions to archaeological knowledge of the area.

IV. PERSONS, GROUPS AND GOVERNMENTAL AGENCIES CONSULTED

In November of 1974, a committee was formed with the expressed purpose of preparing a management plan for the Eureka Dune Special Design Area. Membership of the committee consisted of Mary DeDecker, Bishop, CA (Botany); John Mawby, Deep Springs College (Geology); Mel Dougherty, Bishop, CA (Off-road vehicles); Carol Thorne, Bishop, CA (Off-road vehicles); and Moe Jacobson, Bishop, CA (Recreation, business). The first meeting of this committee took place on December 5, 1974.

Subsequent to the December, 1974 meeting, three more committee meetings were held (Appendix B). Concurrently, with these meetings, news releases were distributed and informational articles were published in the local Bishop newspaper. At the final committee meeting, held in September, 1975, a list of ten vehicle management options, or alternatives, were presented to the committee for its review (Appendix C). The committee did not reach a consensus as to the management approach that would be most desirable.

On December 2, 1975 a public Open House/Workshop was held in Bishop to discuss the management alternatives available for the Eureka Dunes. A draft plan, developed upon a basic compromise between conflicting values and philosophies for managing the dunes was prepared after this meeting and was distributed for public review in February, 1976. By the end of the review period, June 1, 1976, a total of 596 responses had been received. The responses indicated a near even division between complete closure and complete opening of the dunes with a minority supporting a compromise. Approximately 18% of the letters requesting closure was written by 10 individuals.

In addition to the above mentioned persons, the following have been contacted with specific regards to the Eureka Dunes management plan and/or the Environmental Analysis Report.

Allied Senior Citizens
Bishop Womens' Improvement Club
Inyo County Board of Supervisors
Owens Valley Interagency Committee
Bishop High School
Bakersfield District Multiple Use Advisory Board
Bishop Chamber of Commerce
* Derham Giuliani, entomologist
Congressman William Ketchum
Howard G. Wilshire, geologist
Rollin and Grace Enfield, Bishop, CA, archaeologists
Herrick E. Hanks, Archaeologist, Desert Plan Staff, BLM
Ruth D. Simpson, Archaeologist, San Bernardino Co. Museum
Jenny Schumaker Smith, Palo Alto, CA
Inyo County Planning Commission
Robert C. Stebbins, U. C. Berkeley

V. INTENSITY OF PUBLIC INTEREST

There appears to be a fairly high level of public interest in future management of the Eureka Dunes. As is shown in Appendix D, this interest is essentially divided between those persons or groups who would have the dunes open to ORV-oriented recreation, and those who would have the dunes open to non-vehicular recreation or scientific study. As could be expected in an area such as this, which is relatively small in size, few people in general expressed a willingness to significantly compromise their basic positions. This is understandable, as the number of trade-off options are rather limited.

Essentially, public interest in the area has been expressed in the form of correspondence. A limited number of key individuals or interest group representatives have made personal contact with either the Area Manager or the District Manager, but such has not been the case, to any great extent, with members of the general public.

Public attendance at the December, 1975, Open House/Workshop was good, although attendance at the March 11 and 13, 1976 field trips was sparse, especially when compared to the volume of correspondence. A number of participants had previously been in contact with the Area Manager to discuss development of the management plan. Considerable discussion concerning the draft plan took place at the March 25 and 26, 1976 District Advisory Board meeting, but, again, most comments were made by those who had already provided significant input.

Most interest appears to have been generated by circulation of the draft proposal. This seems to have provided a focal point, particularly for those persons geographically separated but sharing common interests, or those who were members of organized groups located some distance from the Owens Valley. At this point in time, there is no data other than as stated by respondants, to indicate whether or not these persons are a significant percentage of actual users of the area.

VI. PARTICIPATING STAFF

Janis L. Bowles, District Ecologist Co-Team Leader	Impact Analysis
Richard Conrad, Outdoor Recreation Planner - Co-Team Leader	Existing Environment
John S. Mooneyham, Planning/Environmental Coordinator	Description Proposed Action and Alternatives, Figures and maps.
Larry Mangan Wildlife Biologist	Wildlife
Brad Hines, Range Conservationist	Vegetation

Douglas McFarland, Geologist	Geology and soils
Dave Worley, Draftsman	Maps and Figures
Lynn Deuerling, Clerk-Typist	Typing

VII. SUMMARY CONCLUSION

Management success is the key to the accurate analysis of impacts. The residual impacts of vehicle use will be partial or complete elimination of vegetation, flora, and ecosystem processes on the dunes. Residual impacts of non-vehicle recreation will be a slight lowering of the carrying capacity of the dune ecosystem on a long-term temporary basis.

The relationship between short-term use of vehicles and long-term productivity of the ecosystem is that vehicles will lower the long-term productivity and may permanently change the energy transfer processes within the system. Non-vehicular activities will not significantly harm long-term productivity.

If the endemic species of flora and fauna are eliminated by recreation, they are irreversibly committed to satisfy a short-term use of recreation. Other resources should not be irretrievably committed to recreation, either vehicle or non-vehicle, if management efforts are successful.

Public interest has been high. Opinions range from advocating closure of the dunes to all use or just to vehicles, to advocating opening the dunes to unlimited vehicle use. The expression of public opinion has mainly been by letter from persons living varying distances from the dunes. The nature of the responses has ranged from the offering of analytical scientific data, or of scientific data backed by emotional responses, to unemotional offerings of all ranges of opinion, to emotional opinion offerings usually advocating opening the dunes to recreation vehicles or completely closing them to vehicles.

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EUREKA SAND DUNES
PUBLIC PARTICIPATION ANALYSIS (Continued)

OPEN	COMPROMISE	CLOSE
		Natural area
After Proposal - 10	3	39
	Open S½; Close N½	Ecological Reserve. Close 'til fully studied
	Open dunes & playa, close N. Saline	Designate R & T's to East

TOTAL: 596-270 Open - 56 Compromise - 252 Close - 18 Information Only

Total as of June 1, 1976

APPENDIX E

BLM"S PROGRAM TO ENSURE COMPLIANCE WITH THE ENDANGERED SPECIES ACT OF 1973 (P.L. 93-205)

Introduction

Forty-eight endangered fish, reptiles, birds, and mammals occur in the 11 Western States and Alaska (see Appendix 1). Thirty-three of these occur or are suspected of occurring on national resource lands (NRL). In addition, the Smithsonian Institution has suggested (September, 1974) that 1,432 species of plants be listed as threatened or endangered in the 11 Western States and Alaska. When lists of threatened animals (including mollusks, crustaceans, and insects) and of threatened or endangered plants are actually published, habitats of several hundred such species will require long-term monitoring, enhancement, and general management by the BLM.

This is necessary for compliance with Section 2c and 7 of the Act which state that all Federal departments and agencies shall utilize their authorities in furtherance of the purposes of the Act, and that no Federal agency shall jeopardize threatened or endangered species or their critical habitats.

Furthermore, the BLM is also responsible for its indirect actions which may affect threatened or endangered species adversely (e.g. destruction of aquatic habitat upstream from a population of endangered fish, or the spilling of oil on the Outer Continental Shelf and subsequent destruction of food and/or habitat for endangered marine mammals).

Current thinking concerning critical habitat -- i.e. the land and/or water area, topography, physiography, flora, fauna, climate, and soil, water, and air qualities necessary for the species to complete their life cycles -- is very broad and may result in significant curtailment or restrictions brought by citizens or citizens' groups, as is clearly provided in the Act, are mineral leasing, geothermal leasing, livestock grazing, off-road vehicle use, timber cutting, and vegetative manipulation, such as chaining, seeding, and application of herbicides.

Clearly, the BLM must have an effective endangered species program to ensure compliance with the Act, to prevent further listings, and to bring about delistings of species now recognized as threatened or endangered. The freedom with which economically important, use-oriented programs continue hinges upon the decision of whether to list or not to list a species as threatened. Thus, it is in the best interest of the Bureau to manage wildlife habitat so as to keep species, such as the Tule Elk, Spotted Owl, Desert Tortoise, and Ferruginous Hawk, off the threatened list. The positive ecological publicity that can be derived from such efforts is significant. The BLM has but to do something, so that there is something to tell people, so that they can support the Bureau!

The BLM Endangered Species Program

Three important steps must be taken immediately to develop an effective, image-building BLM program for endangered species:

1. alignment with the nationwide coordination efforts of the Fish and Wildlife Service,

2. maintenance of a supportive role (technologically, financially, with manpower) in State endangered species programs in cooperation with the States, and

3. development of an active, positive Bureau program as called for in the Act and restated by the Secretary of the Interior in his memorandum of October 16, 1974.

Alignment with the FWS

The BLM has been directed to take action, as appropriate, but does not have the lead in either nationwide or State endangered species programs. The Bureau cannot, under current conditions, go it alone. There is need for a measure of responsible cooperation from all sectors.

Thus, BLM must tune in immediately with the Recovery Team-Recovery Plan concept as conceived by the FWS. Guidelines for Recovery Teams and Plans can be obtained from the FWS. It is important that BLM State Directors, with the assistance of their wildlife staffs, work closely with the appropriate Regional Directors of the FWS.

The BLM can assist the FWS in several ways:

1. BLM Fisheries and Wildlife Biologists have the expertise to lead one or more Recovery Teams.

2. The BLM employs a number of potential members of Recovery Teams.

3. The BLM can supply both basic scientific and habitat management consultation to the FWS.

4. The BLM will comment on Recovery Plans for all species occurring on NRL.

5. The BLM will review proposals for listing and delisting of species that occur on NRL.

6. Ultimately, the BLM's most important role will be to implement habitat management as directed within the framework of Recovery Plans.

Supporting State Endangered Species Programs

The States have the authority to implement the 1973 Endangered Species Act as long as they (1) have the legislated authority to deal with threatened or endangered species, (2) can demonstrate an effective program for the conservation of such species, and (3) coordinate their efforts nationally. Some forward-looking States have already taken the initiative with their endangered species and have shown considerable willingness to cooperate with the BLM.

Accordingly, the BLM should support State-coordinated Recovery Teams and Plans in the same ways listed above for BLM-FWS cooperation. At first, as models for other States, the BLM should provide all available staff expertise, manpower, and funding possible in States that have positive threatened and endangered species programs.

Development of an Active BLM Endangered Species Program

The highest priority to the BLM to ensure compliance with the 1973 Act is keeping BLM activities from adversely impacting critical endangered species habitat or else having mitigating measures (such as positive habitat management plans for the affected species) ready for implementation both inside and outside of resource-use impact areas.

Thus, when habitat management to benefit threatened or endangered species on NRL is delayed in the absence of enabling legislation and/or appropriations at the State level (or through the FWS), the BLM must attempt to act for the species' good and for the Bureau's own protection. Such actions should be coordinated as closely as possible with the State involved and should be consistent with Recovery Plans if available.

Manpower

There is need to add to the field men and women with the biological background -- and empathy! -- to deal with the several hundred threatened or endangered species whose habitat BLM will be held responsible for in the future. This is necessary if the BLM is merely going to catch up with the listing process, let alone keep pace with it. The BLM needs more top-notch zoologists, entomologists, and botanists (or the most versatile management experts) for on-the-ground resolution of the most pressing endangered species - BLM conflicts.

This is not to be a police force to check up on the use-oriented BLM divisions; rather it is to be an in-house information service -- a part of building a strong BLM wildlife program that can lessen the adverse effects of coal extraction, oil shale development, grazing allotments, and other BLM actions that may lead to litigation over non-compliance with the 1973 Endangered Species Act.

Manual Revisions

No program can carry forward expediently and effectively without the necessary Manual guidance. A Bureauwide 6840 Manual should be drafted during the last quarter of FY 75 and finalized during FY 76 by WO and DSC staffs in cooperation with key field personnel. In addition, each BLM division should (as requested by Secretary Morton in his October 16, 1974, memorandum) examine all regulations, laws, guidelines, and Manuals currently in effect. Revisions should be undertaken to ensure compliance with the Endangered Species Act of 1973.

Public Affairs

If the BLM is to get maximum benefit from an endangered species program it must also get involved on a cooperative basis in several highly visible projects which border on being "species management." Public awareness programs should focus on species that are synonymous with national resource lands, namely Sonoran Pronghorn, Black-footed Ferret, Utah Prairie Dog, American and Arctic Peregrine Falcons, Warm Springs Pupfish, etc. First, however, with the exception of the pupfish, BLM must do something (or something more) for the species.

Find Black-footed Ferrets in a Utah Prairie Dog town -- or anywhere outside of South Dakota! Set aside Utah Prairie Dog interpretive areas. Reintroduce American Peregrine Falcons along the Snake River outside of the established Birds of Prey Natural Area, but as a logical extension of that extremely successful BLM project. Any of these projects could be developed for less than $50,000 in project money with a net gain of positive accomplishment for wildlife, invaluable goodwill, and public support for BLM.

BLM's Legislated Responsibility

A new program, like new legislation or a new ethic, is difficult to sell. However, in this case, it is not a matter of whether or not the BLM wants to do something positive for endangered species, whether or not the BLM has the manpower and funding to do anything, or whether or not endangered species are a high priority at the State, District, or Resource Area levels. Rather, all Federal agencies have been legislated into being concerned about threatened or endangered species.

There are two options: making the most of public sentiment or fighting that sentiment in court.

October 2019

Westways

The Magazine for Auto Club Members

Picture Perfect

See the winners of our 2019 photo contest

Jeff Szucs

19-year member ✦ Tulare

The Climb ✦ Sony a99v

{HONORABLE MENTION WINNER IN 2017}

"I was inspired by **Death Valley National Park** and the discovery of two ardent hikers climbing to the top of the 700-foot Eureka Sand Dunes. Along with the contrast of shadow and sunlight at dawn, the two intrepid explorers struggling against the sand and the near-insurmountable task in an unforgiving landscape appeared to make a good composition."

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Eureka Valley Dunes local history binder content list

Compiled by Bob Larson (1934-2024).

The Eureka Dunes is an area of sand dunes in the remote Eureka Valley area of Death Valley National Park. The NPS estimates that the Eureka Dunes have existed for approximately 10,000 years, they and provide a unique habitat for specialized lifeforms to exist—including beetles and plants.

According to the National Park Service website: "The Eureka Dunes lie in the remote Eureka Valley, an enclosed basin at 3000-foot elevation located northwest of Death Valley. The dunes cover an area only 3 miles long and 1 mile wide, yet they are the tallest sand dunes in California, possibly the tallest in all North America. They rise suddenly more than 680 feet above the dry lakebed at their western base. As tall as these dunes are, they are dwarfed by the impressive limestone wall of the Last Chance Mountains which rises another 4000 feet above the valley floor."

Item compiled by/from the collection of Robert Wood "Bob" Larson (1934-2024). Bob Larson was a teacher at Salinas High School in Salinas, California for many years. Bob inherited his aunt Enid A. Larson's home in Big Pine, Inyo County, California in 1991. He and his wife Iva "Ivy" Larson (1932-2006) regularly visited Inyo County; following Ivy's death, Bob permanently relocated to Big Pine in 2013. Bob continued his aunt Enid's collection related to Owens Valley History, and he accumulated articles and books on the natural and human history of Inyo County.

From the Inyo County Free Library Local History Room Collection. Scanned by the Inyo County Free Library in March 2026.

Binder contents (in order of appearance):

Binder cover: Pencil drawing of the words "Eureka Valley Dunes."

Unknown periodical clipping: Magazine article displaying photograph of the Eureka Dunes by artist Nic Stover titled "Flowing Time."

Document: Eureka Valley Dunes brochure by Bureau of Land Management. Includes sections on Recreation Opportunities; Scenic Values; Wilderness; Cultural Resources; Vegetation, Flora and Endangered Plant Species; Wildlife; Geology.

Unknown periodical clipping: "Route 18 – Big Pine to Furnace Creek." Route mentions Eureka Dunes.

Periodical clipping: *Sierra Life* magazine, Jan/Feb 1984 “California’s Desert – Wasteland or Wonderland?” by Mike McWherter.

Unknown document [website printout?]: “Death Valley National Park – Eureka Dunes.” Document text describes Eureka Dunes, with sections: Singing Sand; Island in the Desert; Eureka Dunegrass; Eureka Dunes Evening Primrose; Shining Milkvetch; A Special Place; Booming Dunes; list of other U.S. Sand Dunes.

Images: Two black and white photographs of the Eureka Dunes; top image with handwritten credit “by Enid Larson.”

Periodical clipping: *Sunset* magazine, Jan 2011, p. 72-73. “Beautiful Middle of Nowhere.” Mentions Eureka Dunes.

Document: Flyer titled “Sand Dunes – Death Valley National Park.” Gives information on Eureka Dunes; Saline Valley Dunes; Panamint Dunes; Death Valley Dunes; Ibex Dunes.

Images: Two color 4x6” original photographs. Top image captioned “Last Chance [Mountains] 1998.” Bottom image appears to be of Eureka Dunes, captioned “1992.”

Images: Top image: Color photograph captioned “Ivy 1992.” Appears to be Bob Larson’s wife Iva “Ivy” Larson (1932-2006) at the Eureka Dunes. Bottom image: Color photograph captioned “Bob 1992.” Appears to be Bob Larson (1934-2024) at the Eureka Dunes.

Images: Top image: Color photograph captioned “Bob 1998.” Bob Larson at the Eureka Dunes. Bottom image: Color photograph captioned “Ivy 1998.” Ivy Larson at the Eureka Dunes.

Images: Top image: Color photograph captioned “Bob, Abby, Olivia, Jeff 2009.” Bob Larson with family or friends at the Eureka Dunes. Bottom image: Color photograph captioned “Olivia, Jeff, Abbys Foot, Bob 2009.” Appears to be at Eureka Dunes.

Images: Top image: Color photograph captioned “Eureka Valley 2009” and arrow pointing to “White [Mountain Peak].” Bottom left image: Color photograph captioned “Joan + Jeff 1993”. Appears to be at Eureka Dunes. Bottom right image: “Jeff, Bob + Abby 2009.” Appears to be at Eureka Dunes.

Images: Top image: Color photograph captioned “Bob, Olivia, Abby, Jeff 2009.” Appears to be at Eureka Dunes. Bottom left image: Color photograph captioned “Olivia, Abby, Jeff + Bob 2009.” Appears to be at Eureka Dunes. Bottom right image: Color photograph captioned “Olivia 2009.” Appears to be at Eureka Dunes.

Images: Top image: Color photograph captioned “2009.” Appears to be Eureka Dunes. Bottom image: Color photograph captioned “Bob, Abby, Jeff, Olivia 2009.” Appears to be at Eureka Dunes.

Images: Top image: Color photograph captioned “Olivia 2009.” Appears to be at Eureka Dunes. Color photograph captioned “Jeff, Abby, John, Olivia 2009.” Appears to be at Eureka Dunes.

Images: Top image: Color photograph captioned “Bob + Jeff - 2016” Appears to be at Eureka Dunes. Bottom left image: Color photograph captioned “Jeff.” Appears to be at Eureka Dunes. Bottom right image: Color photograph captioned “Bob.” Appears to be at Eureka Dunes.

Image: Color photograph of sand dunes with no caption. Appears to be Eureka Dunes.

Periodical clipping: “A Day at the Dunes.” Two images of “local Andrew Skaggs”, Elise Robinette, Bill Taylor, Davis Taylor, and “Vane.” Same page, bottom right: Image of Bob Larson on sand dune captioned “Bob Larson 2015.”

Unknown periodical clipping: Color photograph of sand dunes [Eureka Dunes?].

Periodical clipping: *Image* magazine, 29 Dec 1985, p. 41-42. “Diversions – Eureka Dunes: Stark Sands, Sparkling Skies and Solitude.” Text touches on human history around Eureka Dunes, including detachment of the Wheeler Survey that explored Eureka Valley in July 1871.

Unknown document: “Eureka Valley, Named by Lieutenant George M. Wheeler, United States Engineers, as ‘Termination Valley’ in or slightly before 1871.” Text possibly created by / collected by Eastern California Museum director Dorothy Cragen (bottom of text includes “—Cragen”). Text includes quote from D.A. Lyle of the Wheeler Expedition speaking of exploration of Eureka Valley area in July 1871.

Periodical clipping: *Backpacker* magazine, Nov 2014. “Death Valley National Park, California – Play pioneer in one of the Lower 48’s overlooked gems” by Kelly Bastone. Article does not appear to mention Eureka Dunes.

Document: National Park Service informational flyer, “Death Valley – Eureka Dunes.” Undated. Appears to be updated version of earlier informational brochure on Eureka Dunes.

Unknown periodical clipping: Two full-page images of Eureka Dunes area, “Photograph by Darius Orozco.”

Advertisement: Nature’s Valley Oats ‘n Honey Bar. “Neal Cossar’s Nature Valley”, shows image captioned “Eureka Dunes, Death Valley.” Image dated 2007.

Document: Bureau of Land Management flier – “California Desert Conservation Area – Hiking – Eureka Sand Dunes.” Credited to Recreation Opportunity Guides. Reverse includes map of Eureka San Dunes National Natural Landmark section of Death Valley National Park. Undated.

Document: Forest Service flyer – “Eureka Valley Sand Dunes and Death Valley – Inyo National Forest.” Created by USDA Forest Service, Inyo National Forest, White Mountain Ranger District. Undated.

Periodical clipping: *Death Valley Visitors Guide, 10th Edition,* “Eureka Sand Dunes.”

Periodical clipping: *Bishop Visitor's Guide* [no year given], "Scenic Byways." Includes image and information about Eureka Dunes.

Periodical clipping: *Mammoth Sierra Magazine*, Mar-Apr 2010, p. 24-27. "A Day at the Eureka Sand Dunes" by Steve Schmunk.

Periodical clipping: *Jeffrey Pine Journal*, Vol. VII, Issue II. "Get Out!: Exploring Saline Valley" by Todd Vogel.

Newspaper clipping: *Inyo Register*, 21 Jun 2012, p. 1. "NPS Putting together plan for Saline Valley – Public given more time to comment on planning process" by Mike Gervais.

Unknown periodical clipping: "NPS considering a plan for Saline Valley Warm Springs." Hand dated 21 June 2012.

Newspaper clipping: *Inyo Register*, 5 May 2018, p. 1. "Public Comments Sought on Saline Valley Warm Springs Plan."

Newspaper clipping: *Inyo Register*, 7 Nov 2019, p. 1. "Saline Valley Warm Springs update planned."

Newspaper clipping: *The Sheet* (Mammoth Lakes CA), 19 May 2018, p. 5. "Local News – Naked and Afraid (Of Bureaucrats)" by Bodine. Article on Saline Valley Hot Springs.

Newspaper clipping: *Inyo Register*, 24 May 2018, p. 5. "Donkey rescue group to relocate burros from Death Valley."

Newspaper clipping: *Inyo Register*, 29 May 2018, p. 4. "Opinion: Uncommon Sense – Muddy waters in Saline Valley." Opinion piece authored by Carne Lowgren, "columnist."

Newspaper clipping: *Inyo Register*, 21 Jun 2018, p. 4. "Opinion: It is more than the waters that are muddy." Opinion piece authored by Vernon C. Bleich, who introduces himself as "a retired employee of the California Department of Fish and Game" and "a former, longtime resident of Bishop."

Document: "Eureka Dunes Special Design Area Environmental Analysis Report – Bakersfield District Office – Bureau of Land Management – Department of the Interior – July 10, 1976." Missing pages 44-69. Document contains research and information about the Eureka Valley Dunes, including: Land; Geology; Soils; Water; Temperature; Air; Living Components; Flora; Fauna; Ecological Interrelationships; Dune Ecology; Human Values; Landscape Character; Socio-Cultural Interests; Description and Analysis of Proposed Action and Alternatives; [section titled "Proposed Action: Vehicle Use – North Half (Day Only)" is deleted or not included with this copy of the report]; Reports on the possibilities of "Recreation, Non-Vehicle (Outstanding Natural Area)"; "ORV Use by Permit"; "Research by Permit"; Persons, Groups and Governmental Agencies Consulted; Intensity of Public Interest; Participating Staff; Summary Conclusion; Sources; Appendices.

Newspaper clipping [included on page 44 of "Eureka Dunes Special Design Area Environmental Analysis Report"]: *Inyo Register*, 3 Mar 2018, p. A15. "Eureka Valley flower moves from endangered to threatened status."

Document [included after page 74 of "Eureka Dunes Special Design Area Environmental Analysis Report": "Bakersfield District Multiple Use Advisory Board – Meeting and Tour July 23 – 24, 1976 – Agenda." Created by U.S. Department of Interior Bureau of Land Management (BLM), Bakersfield District Office.

Periodical cover: *Westways* magazine, Southern California Automobile Club/AAA, October 2019. Cover is a photo attributed to Jeff Szucs titled "The Climb" depicting the Eureka Dunes.

[ICFL-MS 2026-05-15]